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September, 1960

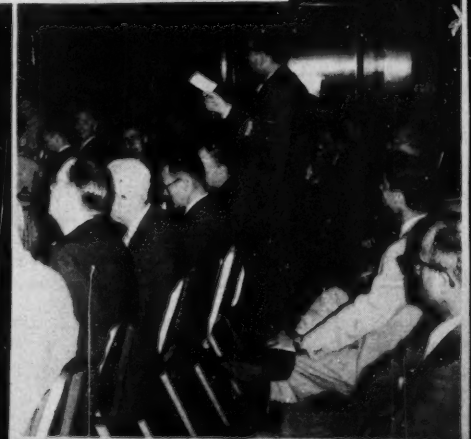
# AACE BULLETIN

## IN THIS ISSUE:

Highlights of Fourth  
Annual Meeting

Symposium on Cost  
Units and Breakdowns

Provisional Definitions,  
Selected Terms





# BULLETIN

Vol. 2, No. 3

September, 1960

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## Notes from the Editor

In this issue we are including an interesting exchange of opinion regarding an article that appeared in the last issue of the *Bulletin*. We hope this will be the forerunner of a regular LETTERS section in our publication. I look forward to receiving your comments and questions about articles and AACE news appearing in the *Bulletin*. All letters must be signed. However, if requested your name will be withheld.

Regional Section development and other regional activities are really booming. Under the leadership of Wes Dodge, *Chairman of Regional Activities*, new sections are being formed and the activities within the established sections are at an all time high. An example of a fine program that was recently held at the Gulf Coast Section is the "Symposium on Cost Units and Breakdowns" appearing in this issue.

I appreciate your cooperation in passing along the AACE information pamphlet that was included with the June issue of the *Bulletin*. We have received a number of applications for membership as a result of your efforts and hope that you will continue to recommend qualified persons for membership.

**Cover:** Candid shots of the Fourth Annual Meeting in Houston, by Cecil H. Chilton.

**Top Photo:** Left to right, C. R. Hirt, J. H. Black and S. Katell review a report. Hirt is President-Elect. **Middle Photo:** Left to right, T. C. Ponder, B. J. Gaffney and J. E. Haselbarth at the banquet. **Bottom Photo:** A. Cohen raising a question at one of the technical sessions.

# Message from the President



Dr. Bernard J. Gaffney  
Wood Conversion Company  
President of AACE

Terra Firma. Seems like writing reports and messages is delegated to airplane travel. Once again this finds me in an airplane longing to get my feet on the ground. Would that I had stuck to cross country running. However let us see where we are, looking from above.

By the time this is before you in the Bulletin you will have received your membership certificates. Am sure as the years roll along the dedicated purpose aptly presented thereon shall increasingly prove out.

There has been no ruling as of this writing on our Federal tax exempt application. This matter should be clarified prior to years end, and our active participation with EJC thereafter realized. A very significant AACE progress step will have been achieved.

Cost indexes are one of the booms to our activity. After my leading of the workshop discussion on this topic in Texas, it is patently clear that this committee shall have plenty of future activity. Those publishing indexes, it is believed, will welcome our appraisals and suggestions. The matter of applying probability and confidence limits will open up advanced methods of applying index data. We are very fortunate to have Mr. Moorehouse accept chairmanship of this committee.

Our treasurer reports that there is a reasonable balance of funds. Our new membership chairman Mr. Gott, I am sure, will direct activities to improve both income and membership activity. He can count on some news from the St. Paul area this Fall.

So far your president has accepted invitations to speak at Pittsburgh, and New York, and also plans to get to the Northeast Ohio and Delaware regions prior to years end.

Much planning must yet be done for the Boston

meeting next year. It is not too early to start rolling up your sleeves and getting your thoughts together. Boston is an enjoyable place. I can say this without bias or prejudice. I came from that environ. Your payout in membership activity must be good or you would not be a member. A little further effort might well prove a particularly gainful incremental investment. Let us all analyze to see where we might be of help to our regional officers and organization. Write articles, express your opinions, make yourself known in your region and to your national officers. When you vote this year let us have a 100% roll call.

Have passed on extra copies of my (W. C. Co.'s) paper on Unified Systems to the regional sections. Perhaps other authors might be so inclined if they had a surplus of their own papers.

Would like to have the membership opinion on a matter that came up at the Texas meeting. A big matter in the next to the biggest state.

How would you like the AACE to undertake to serve as a clearing house for computer programs in the economic field? This suggestion came out of the workshop on computers. It is anticipated that reports summarizing all the workshops will be forthcoming in the Bulletin.

A measurable interest in this computer clearing house idea has already been created. This could be, if handled correctly, a big step for the AACE in forwarding its objectives. Please write opinions at your earliest to Mr. William E. Hand, Shell Development Co., Emeryville, California with a copy to your president and proud owner of a Texas open-road hat. There is a strong possibility of setting up such an AACE function this year, and definite ideas have already been forwarded as to location of the clearing centre. Reply deadline — 2 weeks after you receive this message.

Have written a letter of congratulations to our newly formed London, England section. Perhaps this Bulletin will have more news to report prior to publication.

With respect to our annual meeting in 1961 Mr. William G. Clark of California is the man responsible for the technical program. It is expected that Bill will hold the chairmanship of the Technical Program Committee for two or more years to afford progressive and improved planning of this activity. Looking over our roster of chairmen one can see the representation by regions is quite good. Of course Texas never will be

(Continued on page 50)

## Letters

To C. H. Chilton:

In your article "The Vapor Pressure of Money" (*Bulletin*, June 1960, p. 24), there were two things I could not understand.

In the formula  $R = Y(S - E)/I$  you called  $Y$  the risk factor and said it was the probability of getting rate of return  $R$ . It seems to me that the probability of getting a certain rate of return should be independent of magnitude of that return and *vice versa*.

Common sense tells me that as probability of a return decreases, rate of return must be greater to make the risk worthwhile. This is an inverse proportion instead of a direct proportion as you have shown. Actually, I believe the anticipated rate of return and the probability of that return should be kept as two separate indices, or if combined the result which will be a new index must be individually defined.

Secondly, I am not able to follow the logic of the per-cent-of-return approach to justifying savings in your example on heat exchanger tubes. For instance, why might management set a minimum rate of return — in your example, 25% — when deciding whether a savings is acceptable? I think of a rate of return being applied to an income-producing, long-term investment where something like tube replacement seems

to be a repair or upkeep expense which would be financed out of some reserve account or by the borrowing of money.

In either case, it would seem to me to be better to choose even the stainless tubes, basing the decision on the cost of money. For instance, comparing steel and stainless-steel tubes, the cost of the two — including interest and steel tube replacement every two years — will be about the same in three or four years (see graph).

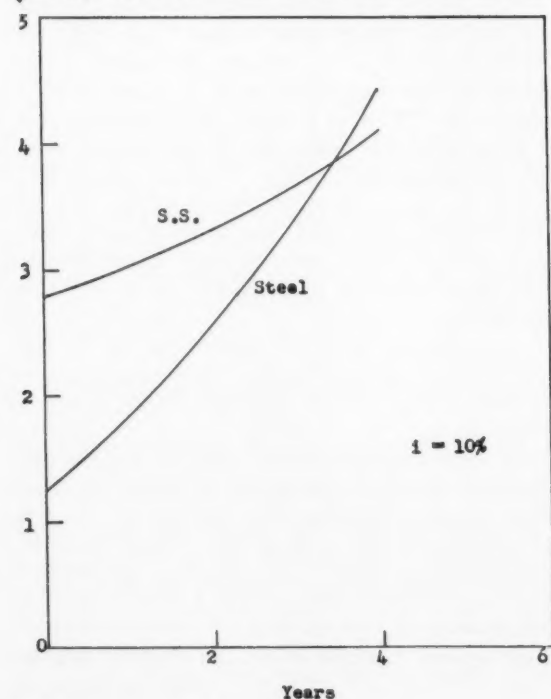
Even at the exorbitant 10% interest rate used in the graph, total cost of stainless steel tubes will have been less than that of plain steel tubes in just four years. For lower interest rates, time to cross-over will be less.

Another comparison that can be made is that of average annual investment if you wish to consider the cost of replacing tubes as an investment instead of an expense. In ten years, total investment in steel tubes will be \$6,000, in stainless tubes \$2,800. However, the average annual investment for this time period will have been \$3,600 for steel, \$2,800 for stainless. This indicates an advantage of \$800 average annual investment in favor of the stainless steel.

W. R. KELLEY  
General Electric Co.  
Johnson City, N. Y.

### This is W. R. Kelley's Graph

Cost, \$1,000 (includes annual compound interest)



From C. H. Chilton:

(1) As to my risk factor  $Y$ , I concede your point. My definition was poorly, even erroneously, stated. I said that  $Y$  is the probability of realizing rate of return  $R$ . What I should have said was that  $Y$  is the confidence placed in the term  $(S - E)/I$ .

Suppose on a proposed investment project, the term  $(S - E)/I$  is 30%, but some basic data (e.g., estimate of market) are not very reliable. The cost engineer may assign a  $Y$  factor of 0.6 and predict an  $R$  of 18%. If management is looking for a minimum 25%, then the project would be either dropped or tabled until better market data can be obtained.

(2) As to the need for computing a tube replacement problem on the basis of return on investment: Anything you do which increases capital investment, whether in the original plant design or after the plant is running, must be justified by an adequate return on that added investment. If you substitute aluminum, brass or stainless tubes, you increase plant investment. The incremental investment must be justified by an adequate level of incremental earnings or savings.

On the other hand, if you replaced corroded steel tubes in kind (i.e., with new steel tubes), there would be no change in capital investment. Expense of re-



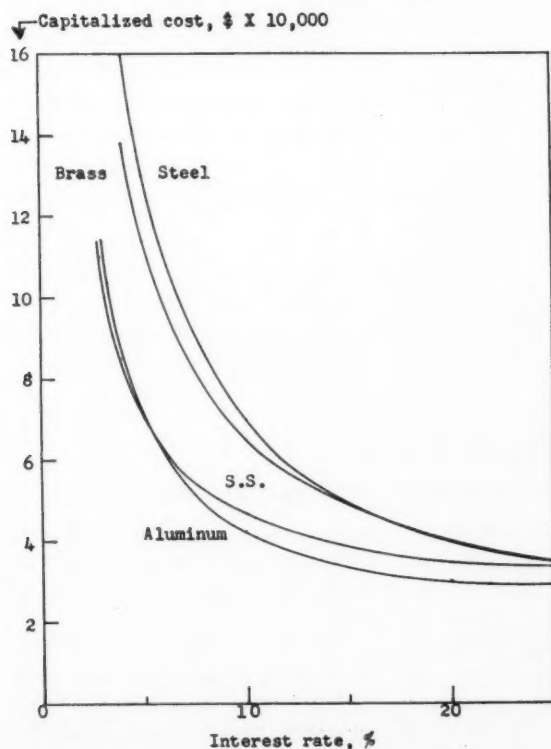
placement would be properly charged to repair costs.

(3) As to comparison of various materials: You point out correctly that with money worth 10% stainless tubes are more economical than steel. However, as the value of money (interest rate, rate of return) increases, stainless begins to lose its economic advantage, until at a sufficiently high interest rate it becomes more expensive than steel.

In a qualitative sense, the same is true for aluminum except that in this problem aluminum retains its relative economy even at extremely high interest rates. Only at extremely low interest rates does aluminum take second place to stainless. This can be seen from an incremental comparison of aluminum *vs.* stainless. Stainless offers an incremental savings of \$20/yr. over aluminum with an added investment of \$1,000, or a 2% rate of return on incremental investment.

Calculations in my article were based on "simple" rate of return; I omitted the effect of compound interest to streamline presentation. I have now recalculated this problem on the basis of capitalized cost, using various time values of money. The graph shows roughly how the four materials compare on this basis. We got essentially the same relationships as predicted on the simpler basis.

**This is C. H. Chilton's Graph**



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(4) One other point seems to bother you, and that is my selection of a particular rate of return of 25% before taxes. In your letter you refer to an interest rate of only 10% as "exorbitant." This is just a difference in point of view. In the chemical process industries — especially those in which there is a high risk of obsolescence — 25% return before taxes is not at all exorbitant. However, there is nothing sacrosanct about my choice of this figure; it merely illustrates the point.

CECIL H. CHILTON  
McGraw-Hill Publishing Co.  
New York, N. Y.

## AACE Election Results

Four hundred and seventy-seven ballots were cast in this close race. Those elected will take office on January 1, 1961.

President: CHARLES R. HIRT .....	469*
Vice President: WILLIAM G. CLARK .....	294*
Donald I. Meikle .....	172
Secretary: THOMAS C. PONDER .....	464*
Treasurer: CECIL H. CHILTON .....	460*
Directors: Daniel T. Brink .....	144
WILLIAM J. HEGERTY .....	240*
Paul A. Hesselgrave .....	150
ADDISON W. SEEKINS .....	205*
Arthur H. Weber .....	183

\*Elected

## PROPOSED SECTION OF BY-LAWS

### Article VII — Financial

Section 5. In the event that the American Association of Cost Engineers should be dissolved for any reason, its assets — physical, monetary, or otherwise — shall be disposed of as follows:

1. All just debts and claims shall be paid from cash on hand, this not being sufficient, said assets shall be sold to pay all debts and claims.

2. Any remaining assets, for which there are no just claims of debts, shall be turned over, without any restrictions whatsoever, to the United Engineering Trustees, Inc., a non-profit scientific and educational corporation whose charter objectives are "the advancement of the engineering arts and sciences in all their branches and to maintain a free public engineering library."

DO YOU APPROVE THE ADDITION OF THE ABOVE SECTION TO ARTICLE VII OF THE BY-LAWS? YES — 446, NO — 14.

By-Laws were amended by addition of Article VII above.

# A Symposium on Cost Units and Breakdowns

The report of the Regional Sections Committee presented at the June meeting in Houston emphasized the strong program activity going on throughout the Association. To encourage this strength, the Publications Committee urges

the regions to forward manuscripts of papers presented locally.

On March 25, 1960, the Gulf Coast Section met to hear a panel discuss some special problems of estimating construction costs. Under the guidance of the program chairman, Duncan Allen, the six

experts gave talks which are condensed in the following pages.

(One of the talks was not available in manuscript. This was a presentation on air conditioning and mechanical estimating by W. A. Harbaugh, Straus-Frank Co., Houston.)

## Excavation, Concrete and Structural Steel

A. H. Weber, Tellepsen Petro-Chem Constructors, Houston, Texas

Three fundamental parts of plant construction — excavation, concrete and structural steel — comprise the groundwork, foundations and supporting structures of the plant. I prefer to divide these as follows:

- Site work — All excavation, fill, grading, topping, *etc.*, not required for foundations or structures.

- Foundation work — All earth and concrete work required for the construction of concrete foundations and structures on the job.

- Structural steel work — All structures, structural supports and miscellaneous access and safety steel required for the plant.

Purpose of this discussion is to investigate requirements for standard take-off for the aforementioned functions, standard units of quantity and evaluation of costs to apply to the results. To do this, we should first discuss something more basic — planning. Nothing is more useless than to head into a proposed project without first planning for the desired results.

Each job should be attacked in the same manner to lend continuity to your estimates.

1. Read the scope of the work so that you know what the basic project is. Study the drawings so that you know the function of the portion to be taken off. Review

specifications so you know what is expected.

2. Plan the method of take-off so that your results will be compatible with the required cost data.

3. Take quantities off in accordance with your plan in units that you can price. Take-off generally should be made in a standard, logical fashion so that anyone basically familiar with the job can check the calculations, or so that several people can take off different parts of the same project.

No one take-off form will satisfy all these three basic functions. I use three — one each for site excavation, concrete and structural steel.

Recapitulation of the take-off should be made in logical form, following as closely as possible chronological order of work and including as much detail as is required for pricing materials and evaluating labor.

## Plumbing and Process Piping

Bill Swanson, Swanson Plumbing & Appliance Co., Houston, Texas

A short-cut unit method of estimating is covered here to give the contractor a quick check on estimate figures. Labor estimates for installation of a wide variety of individual plumbing units are given. The estimator determines which of the units described is

Material pricing is comparatively simple. Although normally of more value than labor, these prices can, for the most part, be pinned down through quotations and published data.

Labor costs, however, require considerable evaluation and vary because of area trade rates, economic conditions, quality of supervision, job conditions and other factors affecting efficiency of job labor costs.

I use unit prices to cost work, with man-hour requirement checks. A conversion to man-hour evaluation, however, is probably a more realistic approach. The ideal, of course, would be to reduce evaluation to craft man-hours, but in delving into details of this I haven't been able to settle in my own mind all its ramifications. It would lend itself well, apparently, to use of data processing equipment for both estimate and cost records.

nearest those called for in his plans and multiplies labor estimate for one unit by number of times the unit appears in his plans.

All data on labor estimates have been checked against actual installations. You should remember, however, that different conditions

on specific jobs may change considerably both labor and material requirements.

No one should undertake estimating quantities of material required and cost of labor from plans until he has reached the point where a drawing is as easily comprehended as a book dealing with a familiar subject.

When plans and specifications are obtained, before starting any calculation, study the plans carefully until you have a mental picture of the installation. Next, read the specifications through, making notes of all material and equipment required. You will then have a comprehensive idea of the job which you are about to survey and figure. Next, check the building code and make required corrections. Making an accurate survey is very important and necessary to obtain a conservative labor cost.

Included below are some average requirements for installing and connecting plumbing fixtures. Obviously figures which apply to larger jobs may not be suitable for use by the estimator who must figure smaller installations. More care is undoubtedly necessary in the latter case.

Figures given are based upon the work performed by one mechanic and one helper in eight hours.

#### Some Labor Requirements

For testing piping with water tests, allow one day's labor for three floors for each set of risers. For instance in a building with six floors and three sets of risers, it's necessary to allow  $(6/3)3 = 6$  days of labor.

Labor cost involved in handling, placing fixtures at installation location and uncrating by mechanic and helper is  $\frac{1}{2}$  hr./fixture.

To install one floor of risers — consisting of cast iron soil stack, vent stack, hot and cold water risers, roughing for fixtures complete

and finishing — the labor costs for mechanic and helper are  $1\frac{1}{2}$ -2 days /fixture.

For extra-heavy cast iron soil pipe and fittings in trench or laid on floor, figure the following labor for floor work and stacks:

Diameter	Joints/Day
2 in.	16
3	14
4	12
5	10
6	10
8	8
10	8
12	6

Shown in the next table is the number of joints per day which can be made with extra-heavy cast iron soil pipe in sizes from 2-15 in. Estimates are based on labor of one mechanic and one helper.

Pipe Dia.	Joints/Day
2 in.	8
3	7
4	6
5	5
6	5
8	4
10	3
12	3
15	$2\frac{1}{2}$

Following table presents average lead requirements for extra-heavy cast iron soil pipe. If combined diameters in inches of cast iron joints are computed, divided by 60 and multiplied by 45, result will be the required number of pounds of pig lead for caulking. Allow 10%, by weight, of this amount for oakum.

Diameter	Lead Wt., Lb.
2	$1\frac{1}{2}$
3	$2\frac{1}{4}$
4	3
5	4
6	$4\frac{1}{2}$
8	6
10	$7\frac{1}{2}$
12	9

From the next table, you can estimate number of feet of Universal

pipe which can be installed in one day by one mechanic and one helper in trench installations.

Diameter	Ft./Day
3	100
4	80
6	60
8	40
10	20
12	20

Amount of Duriron pipe which a mechanic and helper can lay in a day may be figured on basis of the sum of diameters of pipe laid.

Stacks and runouts . . 40 in./day\*

Trench . . . . . 50 in./day

A drain suspended on ceiling . . . . 25 in./day

The contractor who underbids through faulty estimating not only bankrupts himself but also harms his competitors who are bidding on a sound basis. The necessity of publicizing reliable principles of estimating is obvious, and the successful contractor who once offered to lend his expert estimator to teach any local competitor was a farsighted businessman.

Piping represents a large sum of the total cost of installation of an industrial, chemical or oil plant. It may run as high as 50% of the entire cost of the plant, including land and buildings, and often 70% of the equipment. Piping consists of a maze of comparatively small, inexpensive parts.

Taking off exact quantities of piping, valves, fittings, instruments and specialties from a set of piping plans and specifications and estimating cost of material and labor is a nightmare to a junior estimator. An experienced estimator knows there is no short-cut through the field of lump-sum competitive bidding. He also knows that if a set of plans and specifications shows a tendency to omit necessary details, the lump-sum estimate must include an intangible contingency item of cost.

\*i.e., 40 one-in. joints, 20 two-in. joints, etc.

## Commercial Roofing

J. W. Kaff, Hou-Tex Roofing Co., Houston, Texas

There are two general types of roofing used currently on commercial buildings — sheet roofs and built-up roofs.

Sheet roofs are corrugated asbestos, corrugated galvanized iron, asbestos-protected metal and corrugated stainless steel. Built-up roofs are of three types: gravel-surfaced, smooth-surfaced and mineral-surfaced.

Gravel-surfaced roofs may be of asphalt or coal-tar pitch products. Felts used may be of rag, asbestos or glass fiber base.

Smooth-surfaced roofs are composed of asbestos or glass felts, high-melting-point asphalt and a cold asphalt roof coating for surfacing. These roofs may further be coated with aluminum roof coating for appearance and heat reflection.

Mineral-surfaced roofs are composed of rag felts, 19-in. mineral-surfaced, selva-edge roofing, and high-melting-point asphalts.

The roof selected for a particular job can be generally determined by three factors. First, the length of time the roof is to last; second, the type of deck over which the

roof is to be applied; third, the slope of the roof deck.

The roofing and sheet-metal contractor generally furnishes the following items in his contract: built-up roof, roof insulation, fiber cant strip, composition and metal flashing, shop-made drains, downspouts, eave strips, expansion joints, fascia covers, gravel stops, gutters, pitch pans, metal riglets, scuppers, splash pans, roof ventilators.

The standard units of take-off for making an estimate are squares (100 sq. ft.), lineal ft. and sq. ft. After the quantity take-off has been made, various other units are used such as rolls, pounds, cu. yd. and gal., all of which are commonly used in the trade.

Labor is computed as number of squares of labor; insurance, taxes and overhead at a percentage of applicable costs.

Literature in national roofing publications and conversations with roofing contractors from various sections indicate that this unit take-off and costing, with minor variations, is used all over the U. S. and Canada.

know several companies which now use a similar system with certain modification. Let's call it the breakdown budget method.

It's possible that a cost engineer would know enough about the proposed job, or have cost records available from similar jobs in the past, to judge one or all three of the following cost divisions:

Example — *Power*: say this phase is small, and a good allowance would be \$5,000. *Lighting*: similar to a job x estimated or built some time ago which amounted to \$10,000. *Instrumentation*: similar to another job y estimated before at \$5,000. Total cost is \$20,000.

However, a more accurate application of this method would be to use units as shown in Table 1. Under power, for example, quantity and sizes of motors determine all basic elements for this division of electrical installation cost — size of service transformers, size of switchgear, and quantity and sizes of conduit and wire.

Again, under lighting and instrumentation, extent of electrical material and labor is determined by the simple units of the remote electrical outlets. Note that the electrical estimate usually does not contain cost of purchasing instruments or their operating devices. Mechanical groups, generally furnish these items.

Unit costs shown in Table 1 can, of course, vary widely from fluctuations in material costs, labor rates, separation of equipment, market conditions, etc. Variations of 100% are possible unless careful thought was given to selection of their values.

### Detail Electrical Estimating

Table 2 shows three methods of unit costing for detail estimates. The second system is used by many estimators, and I often combine the first and second.

The best estimate is made by  
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## Electrical Installations

J. D. Watson, Hirsh Electric Co., Houston, Texas

What will an electrical installation cost? This question leads to an answer of the need for standard, uniform methods of estimating. There are two ways to estimate a job — by "budget" and "detail-cost" methods. Several books describe these methods.<sup>1,2,3</sup>

Of these two estimates, let's first consider the budget, short-cut type. Each company or individual has his own method, and we will cover this only briefly. The detail cost, a more accurate method, is really our main business here.

### Three Ways to Budget Estimates

A simple method for budget estimates is to allow some dollar value, covering material and labor, per horsepower or kilowatt of connected load in the over-all job. Study of past projects (their costs divided by total loads) should give you a working base.

This budget unit base multiplied by the new project load gives budget estimate for the new project.

Another method could be used universally by this association. I



Use These Units for Budget Estimating — Table 1

Work Division	Units	Unit Cost
Power	0-10 hp. motor	\$ 500
	15-30 hp. motor	1,000
	40-75 hp. motor	2,000
	100-250 hp. motor	4,000
	Welding receptacle	1,000
Lighting	Toggle switch	120
	Receptacle	120
	120 v. motor outlet	120
	Other 120 v. outlet	120
	Grounding	120
Instrumentation	Remote Sensing or actuating devices. (Thermocouples, alarm switches, etc.)	300

Here Are Three Detail Unit Cost Methods — Table 2

Method of Estimate	Comment
Cost for each unit includes both material and labor.	Subject to frequent revision in changing labor and materials markets.
Unit cost includes only labor.	Material priced separately.
Unit cost based on dollars/pound.	Accuracy suffers when unit pricing not a linear function of weight.

complete and detailed take-off from drawings, listing everything from switchgear to locknuts. After pricing, we obtain a total cost of material and labor man-hours and convert to dollars and cents by applying local labor rates, insurance, taxes, expenses, etc.

Since the backbone of this system is the "unit," it's important that good definition of units is established. I advocate that all cost engineers within a group, company or association should use the same units. This permits easier checking both in office and field, facilitates

adjustment and future use, and makes possible multi-man estimating for the same job.

As with budget estimates, the detail estimate can be taken off and figured in three divisions: power, lighting and instrumentation. This permits a rough check of the final figure by a short-cut method, and it provides a future source of cost information for new budget estimates.

Although I don't think that one printed take-off form is feasible for all electrical construction jobs, there is a group of forms that provides good standard practice. Used by members of the National Electrical Contractors Assn., the four forms include an estimate summary, a pricing sheet, a feeder schedule and a general take-off form.

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2. Page, J., and J. Nation, "Estimators Electrical Manhour Manual." Gulf Publishing Co., Houston.
3. Sherlock, G.L., "Blue Book of Electrical Estimating." Estimating Handbook Assn., DeKalb, Ill.

## Masonry

Louis Dallavia, Consultant, Houston, Texas

Preparation of a bid or budget estimate for the cost of masonry work requires knowledge of various factors of the work. These include type of building (housing, commercial, institutional, multi-storied or industrial plant); wall condition (veneer — single masonry unit — and composite designs with complex masonry components); kind of mortar; style of mortar joint and type of bonding condition.

Cost of the masonry work may be developed from a check list comprising three phases: indirect material costs, direct material costs and direct production costs. Table 1 shows such a check list.

Masonry components in a wall are estimated by multiplying net surface area of the wall, sq. ft., by the component square foot factor — the number of masonry units contained in one square foot, including mortar joints.

This general approach for masonry work is accomplished by considering each masonry type separately. Mortar is then estimated for each type.

To estimate large projects containing complex masonry components, develop a procedure to take off from plans all masonry materials in one operation. Accumulate the net sq. ft. of wall surface area of each masonry component for extension. This is done using an estimating pad containing ten or more columns.

List and schedule all masonry

BY \_\_\_\_\_ DATE \_\_\_\_\_  
 CHKD. BY \_\_\_\_\_ DATE \_\_\_\_\_

## ESTIMATING STANDARDS

 SHEET NO. 1 OF 4  
 JOB NO. \_\_\_\_\_

## EXHIBIT - 1

## PRODUCTION RANGE INDEX

PRODUCTION ELEMENTS	PRODUCTIVITY, STANDARD MINUTES, PER HOUR						LOCAL FACTOR %
	20	30	40	45	50	60	
	PRODUCTION EFFICIENCY, PER CENT						
	33	50	66	75	83	100	
	LOW		AVERAGE		HIGH		
1. GENERAL ECONOMY LOCAL BUSINESS TREND CONSTRUCTION VOLUME UNEMPLOYMENT	PROSPEROUS STIMULATED HIGH LOW		NORMAL NORMAL NORMAL NORMAL		HARD TIMES DEPRESSED LOW HIGH		
2. AMOUNT OF WORK DESIGN AREAS MANUAL OPERATIONS MECHANIZED OPERATIONS	LIMITED UNFAVORABLE LIMITED LIMITED		AVERAGE AVERAGE AVERAGE AVERAGE		EXTENSIVE FAVORABLE EXTENSIVE EXTENSIVE		
3. FIELD LABOR CRAFTSMEN SUPPLY JOB ATTITUDE	POOR POOR SCARCE POOR		AVERAGE AVERAGE NORMAL AVERAGE		GOOD GOOD SURPLUS GOOD		
4. FIELD SUPERVISION COMPETENCE SUPPLY PUBLIC RELATIONS	POOR POOR SCARCE POOR		AVERAGE AVERAGE NORMAL AVERAGE		GOOD GOOD SURPLUS GOOD		
5. JOB CONDITIONS MANAGEMENT SITE & MATERIALS WORKMANSHIP REQUIRED LENGTH OF OPERATION HEALTH HAZARDS	POOR POOR UNFAVORABLE FIRST RATE SHORT HIGH		AVERAGE AVERAGE AVERAGE REGULAR AVERAGE NORMAL		GOOD GOOD FAVORABLE PASSABLE LONG LOW		
6. WEATHER PRECIPITATION COLD HEAT	BAD MUCH BITTER OPPRESSIVE		FAIR SOME MODERATE MODERATE		GOOD Occasional Occasional Occasional		
7. EQUIPMENT & TOOLS APPLICABILITY CONDITION MAINTENANCE, REPAIRS	POOR POOR POOR SLOW		NORMAL NORMAL FAIR AVERAGE		GOOD GOOD GOOD QUICK		
8. DELAYS JOB FLEXIBILITY DELIVERY EXPEDITING	NUMEROUS POOR SLOW POOR		SOME AVERAGE NORMAL AVERAGE		MINIMUM GOOD PROMPT GOOD		
9. OTHER ELEMENTS:							

TOTAL JOB CONDITION FACTOR \_\_\_\_\_ %

TOTAL JOB CONDITION FACTOR ÷ NUMBER ELEMENTS USED = JOB EFFICIENCY FACTOR

\_\_\_\_\_ ÷ \_\_\_\_\_ = \_\_\_\_\_ %

AN ESTIMATING SYSTEM THAT CANNOT BECOME OUT OF DATE

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Figure 1 — Production Range Index

materials shown on the drawings and wall sections. Compute surface area of each masonry component by using favorable long elevations and heights.

All openings such as doors, windows, open bays, etc., are scheduled as "outs" condition. "Outs" figures are marked in red to indicate a subtraction within the summation column.

#### Check List for Masonry Costs — Table 1

##### Indirect Material Costs

Plant items, equipment and tools  
Hoisting tower, hoist, derrick, operator

Scaffolding (swing, tubular, wood, planks)

Mortar mixer, masonry saws, pallet equipment

##### Direct Material Costs

Exterior and interior masonry walls

Masonry components (brick, tile, block, stone)

Mortar, design mix, coloring, admix

Anchors, wall ties, anchor slots, reinforcing

Waterproofing, membrane, coating, parging

##### Direct Production Costs

Masonry Components

Erection, placing, laying

Bonding, anchorage

Waterproofing

Cleaning and protecting

The derived net area of each masonry component is then computed from the material sq. ft. factor for total estimated quantities. A breakage and waste allowance should be included for each material item in the estimate.

The cost of materials is easily estimated by using dealers' quotations for the proposed project construction.

#### Cost of Masonry Labor

To estimate labor cost for installing masonry has been a major

#### Shift Costs — Table 2

No.	Crewmen	Man-Day	Index Rate	Index Cost
1/2	Bricklayer foreman	0.5	\$4.25	\$ 17.00
4	Bricklayer	4.0	4.00	128.00
1	Mortar mixer	1.0	2.325	18.60
3	Tender	3.0	2.225	53.40
	Composite crew	8.5		\$217.00

#### Output Range for Common Brick — Table 3

Scheduled Masonry Work	Production, Units Laid					
	Low Eff. 33%	50%	Avg. Eff. 66%	75%	High Eff. 83%	100%
4-in. nominal wall	1,600	2,400	3,200	3,600	4,000	4,800
8-in. nominal wall	2,100	3,200	4,200	4,800	5,300	6,400
8-in. back-up wall	2,500	3,800	5,000	5,700	6,300	7,600

#### Unit Costs — Table 4

Production Per Shift, Units Laid	Labor Cost Per Unit	Production Per Shift, Units Laid	Labor Cost Per Unit	Production Per Shift, Units Laid	Labor Cost Per Unit
1,600	\$0.1356	4,000	0.0542	5,800	0.0374
2,100	0.1033	4,200	0.0516	6,000	0.0361
2,400	0.0904	4,800	0.0452	6,200	0.0350
2,500	0.0868	5,000	0.0434	6,400	0.0339
3,200	0.0678	5,200	0.0417	7,600	0.0285
3,600	0.0602	5,400	0.0401		
3,800	0.0571	5,600	0.0387		

problem to many estimators and cost engineers.

Industry practice of projecting unit cost factors for estimating from historical cost records has proven, in most cases, quite satisfactory provided local construction economy is stabilized and cycling uniformly. When construction costs begin to rise or fall in cycles, however, we may under-or overestimate the cost.

This unfortunate situation is a result of the indirect estimating approach. We must project costs from a direct, basic-approach source that will permit us to keep track of the changing construction-cost curve.

The direct approach to estimating masonry labor productivity cost is by use of the "typical-shift" crew or composite crews. This is the basis for performance of various construction production operations under local conditions by

the contractor or construction division of a company.

Labor cost factors more accurately reflecting final costs of the work can be produced by analyzing and evaluating elements affecting productivity and cost of the work. The available production efficiency factor, pinpointed under local job conditions, results in arriving at the masonry labor unit cost factor we are seeking.

Fig. 1 shows the Production Range Index. From this you derive a job production efficiency factor by applying all known and foreseen conditions that affect production and cost of the work. Index is a production efficiency check chart for guiding the estimator in rating productivity available on the job for which he is estimating costs.

Table 2 shows shift costs of a typical masonry crew. The index wage rates reflect 1959-60 Houston-

(Continued on page 61)

## Highlights of the Fourth Annual Meeting

Chaplin Tyler of the E. I. du Pont de Nemours & Co. received the "Award of Merit" of the American Association of Cost Engineers for 1960, the highest honor the association can bestow upon a member of the engineering profession. Along with the Award of Merit Scroll, Mr. Tyler was presented with a special slide rule which was donated through the generosity of Keuffel and Esser. Tyler was awarded this honor for his outstanding contributions to cost engineering economics, analysis and its application to the chemical process industries.

His activities in du Pont's Development Department

include many years in forecasting and economic studies and he is regarded as an influential behind-the-scenes man. A graduate of MIT with a S.M. degree, he spent several years on the staff of "Chemical and Metallurgical Engineering" as an editor.

Tyler, a member of several engineering societies, served a three-year duty as lecturer in Economics at the University of Delaware, is author of *Chemical Engineering Economics* and a contributor to the *Encyclopedia of Chemical Technology*. In 1951-52, he was a consultant in technology to the President's Materials Policy commission.

## Minutes of Board of Directors Meeting

AACE — Houston, Texas (Rice Hotel)

June 11-15, 1960

The meeting was called to order at 8:30 p.m., Saturday, June 11, 1960 by President Gaffney. Officers and Directors present were:

### Officers & Directors

Cecil H. Chilton  
Earl K. Clark  
B. J. Gaffney  
W. E. Hand  
C. A. Miller  
Sidney Katell  
Thomas C. Ponder

### By Invitation

Edward D. Shanken, Executive Secretary

Minutes of previous Board Meeting of February 4-6, 1960 were approved as corrected.

### Major Problems of the 4th Annual Meeting

Earl K. Clark made the following suggestions to the Board:

1. Do not appoint a National Program Chairman who is also a Board member.
2. Start Program Chairman working in July before the next annual meeting in June.
3. A permanent technical program committee should be appointed. This committee would operate on a continuing basis under supervision of the Board of Directors.

### Treasurer's Report

Chilton pointed out that income is running behind budget and that expenses are running ahead of budget. The interim treasurer's report as of April 1960 was accepted and approved.

### Future Annual Meeting Locations

Chilton reported for Gorey results from survey of

Regional Sections desiring to host national meetings as follows:

- 1961 — Boston
- 1962 or 1963 — Chicago
- 1963 — San Francisco
- 1964 — New York
- 1965, 6, or 7 — Cleveland and New Orleans

Subject to unforeseen circumstances, the Board selected the following sites for future meetings:

- 1961 — Boston
- 1962 — Chicago
- 1963 — San Francisco
- 1964 — New York (June 22-26, 1964, Manhattan Hotel.)

The New York Section is requested to take option on these dates and hotel locations because of the World's Fair being held in New York City in 1964.



C. A. Miller, Montreal, Canada; S. Katell, Morgantown, West Virginia, and J. G. Brown, New York City, take care of some important business at breakfast during the Annual Meeting.



**Awards Committee** — C. A. Miller, Chairman

No life memberships will be given this year. Life memberships will be reserved for those members giving outstanding service to AACE. . .

The Board voted "That we recognize each past president and present a pin with special inscription and certificate at the annual meeting starting in 1961 at Boston."

Suitable awards for 5 years of continuous service to AACE will be handled by Gaffney for 1961.

December issue of the Bulletin will request nominations for Award of Merit from the membership. Shanken will handle for Bulletin.

**Nominating Committee** — C. A. Miller, Chairman

President — C. R. Hirt, Procter & Gamble Co., Cincinnati, Ohio

Vice President — W. G. Clark, The Dow Chemical Co., Pittsburgh, Calif., D. I. Meikle, Meissner Engrs., Inc., Chicago, Illinois

Treasurer — Cecil H. Chilton, **Chemical Engineering**, New York City

Secretary — Thomas C. Ponder, **Petroleum Refiner**, Houston, Texas

Directors-at-Large — D. T. Brink, Corn Products, Chicago, Illinois, W. J. Hegerty, Colonial Iron Works, Cleveland, Ohio, P. A. Hesselgrave, General Electric, San Jose, Calif., A. W. Seekins, Columbia-Southern, Pittsburgh, Pa., A. H. Weber, Tellepsen Construction Co., Houston

**Planning Committee** — J. C. Agarwal, Chairman (Absent)

The Board agreed that "Must have something tangible from AACE to offer the membership and others to get the story of AACE across. Must make some substantial gains and publish some results of our Technical Committees. Cost Index will be the first step. Recognition by Management will come with these tangible results."

**Publicity Committee** — Thomas H. Arnold, Chairman

The Board requested that "Tom Arnold shall prepare a promotion piece to create a favorable impression to management (of AACE). This will be separate from the Bulletin. This will contain a selling program to convince management of the importance of AACE.

Secretaries of Regional Sections have been appointed members of this committee. A manual will be prepared to guide these members in preparing publicity releases.

**Bibliography**

The Board renewed the cooperative agreement with the Bureau of Mines for continuation and publication

September, 1960 — AACE BULLETIN

of the annual cost bibliography for a period ending June 30, 1961 under the same terms and conditions.

**Publication Standards** — J. G. Hoyt for J. F. Adams

Revised version dated April 12, 1960 was presented and tabled until reviewed by Gaffney.

**Membership Committee** — W. F. Gott, Chairman

Earl K. Clark will transfer the files to Gott immediately.

**Admissions Committee** — Carl C. Clayton, Chairman

For period January 1, 1960 to May 31, 1960, 96 applications for membership have been processed with 77 approved as Members, 19 approved as Associate. Eight applications are now in the hands of the committee. One Associate member was transferred to Member status. Committee members are; John Faber, Fred Franks, James Weaver, James W. Perry.

As of June 6, 1960 there were 768 members, 25 applications pending, equaling 793. 89 were unpaid of the 768. Second delinquent due letters have been mailed. New application forms have been prepared by Shanken.

**Regional Section Activities Committee** — Wesley J. Dodge, Chairman. Members of this committee are the presidents of the Regional Sections.

Regional Sections now are:

Chicago

Delaware Valley Section

Gulf Coast Section

Metropolitan New York

New England

Northeast Ohio

Pittsburgh

San Francisco

Sections being organized are:

Detroit, Michigan — Gilbert A. Smith, The Bristol Co., 10329 W. Nichols Road, Detroit, Michigan

Kansas City, Missouri — Lloyd E. Weast, Jr., 3817 E. 72nd Street Terrace, Kansas City, Missouri

Los Angeles, California — Frank M. Russell, AETRON, Estimating Dept., 410 North Citrus Avenue, Covina, Calif.

Toronto, Canada — Frank Grosvenor, The Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, Canada

Montreal, Canada — James Bachman, 175 Hemlock Drive, Beaconsfield Quebec, Canada

St. Paul, Minnesota — Dr. B. J. Gaffney, Wood Conversion Co., First Nat'l Bk. Bldg., St. Paul, Minnesota

Niagara Frontier — Richard G. Hopper, Uhl, Hall & Rich, P. O. Box 327, Niagara Falls, New York

Cincinnati, Ohio — Richard A. St. John, Na-

tional Lead Co., of Ohio, P. O. Box 158, Cincinnati 39, Ohio

#### **Insignia & Certificates**

Ed Shanken has had difficulty obtaining oval gold seals for the certificates but has located them now and the certificates will be mailed as soon as they are processed.

**Technical Committee Reports** — W. E. Hand, Director Sponsor

**Capital Cost Control** — C. R. Hirt, Chairman

This committee sponsored four workshops at the 4th Annual meeting. It is felt that these workshops are a step in the right direction and that they should inspire this committee to greater effort.

**Capital Cost Estimating** — Chairman to be appointed

This committee sponsored five workshops at the 4th Annual meeting.

**Operating Cost Estimating and Control** — W. J. Hegerty, Chairman

Will have committee meeting during the 4th Annual meeting.

**Profitability Committee** — A. G. Bates, Chairman

This committee sponsored five workshops at the 4th Annual meeting.

**Cost Index Committee** — G. W. Boston, Chairman

This committee could work up data on standard size centrifugal pumps. Also application for various types of equipment and materials.

Earl K. Clark will write a report on what are the duties and expectations of a Technical Program Chairman.

William G. Clark was appointed Technical Program Chairman for the Boston meeting in June, 1961. Harold J. DeLameter was appointed General Arrangements Committee Chairman for the Boston Meeting.

#### **Boston Meeting, June 21-23, 1961**

The Board requested additional information on housing and location for the Boston meeting. Need description of various locations. The current trend is away from the family type meetings. General information regarding locations around Boston will be supplied to the Board by DeLameter by July 1, 1960. Board to make a decision no later than July 15, 1960.

Estimated attendance for Boston meeting 300-350. (Since meeting it was decided to meet at the Somerset Hotel, Boston — June 21-23, 1961)

#### **Tellers Committee**

The following were appointed tellers for the fall election: Neil B. Griebenow, Fredrick Wyrhaeuser, Donald Spoor

#### **Research for Cost Engineering**

The Board is in sympathy with the proposal but it needs further investigation by Schrader and his



Some intent Cost Engineers attending one of the technical sessions in Houston.

committee at the University of Illinois as to the mechanics of the administration, solicitation of funds and operation. All members of this Board of Cost Engineering Research should be AACE members.

#### **Tax Status**

If the AACE is dissolved, what happens to its assets? Secretary will draft an amendment to the Constitution for disposal of assets in the event of dissolution. This shall be sent to all Board members by June 21, 1960. They will reply. Final form of amendment to be sent to Shanken. Amendment is as follows:

(By receiving the necessary  $\frac{2}{3}$  vote Article VII has been added to the By-Laws. See page 41.)

#### **Next Meeting of the Board**

Partial meeting to be held during October, 1960 in New York City with Gaffney, Chilton, Gorey, Shanken, Miller and Hirt attending.

#### **4th Annual Meeting — Houston, Texas**

The Board voted that thanks be extended to the Gulf Coast Section for their fine arrangements for the 4th Annual Meeting.

— Adjourned —

#### **Message from the President**

(Continued from page 39)

satisfied, even if they don't say so. Seriously, they certainly deserve much credit for a smoothly run annual meeting, as well as a productive one.

Well guess I'll duck now under that Texas hat of mine while this plane goes through those imposing black clouds — worst comes to worst I can use it for a parachute. Regards to you all — and keep up the good work.

**AACE Cost Index Manual**  
is off the press  
**GET YOUR COPY NOW**  
See page 63 for further details

# News from the Regions

## REGIONAL SECTION ACTIVITIES

In Houston last June, the Regional Section Committee established the objective of enrolling eight new regional sections into the AACE this season. The enthusiasm of our members in new areas has already brought us a long ways toward fulfilling this objective. It is only the month of September and already four sections are rapidly approaching the stage of officially applying for a charter. Here are some of the accomplishments of these groups as reported to date:

### LOS ANGELES

Spearheaded by Frank Russell, an organization meeting has been called for September 29. A total of 26 people have made reservations to attend. Our San Francisco section has been in close touch and has given them suggestions and copies of their constitution for guidance. It looks as though they are off to a flying start.

### NIAGARA FRONTIER

This group under Dick Hopper has already had two meetings. At the second meeting they discussed and adopted a constitution prepared by Paul Caro and Bill Silvia. The name "Niagara Frontier Section" was selected and officers and directors were elected. Apparently only the formal approval of the National Board remains before this group will become our "ninth" section!

### BRITISH GROUP, AACE

Thirteen engineers met in London on July 14 and immediately set about the forming of an organization. A full account of this meeting appears elsewhere in the Bulletin. We send our heartiest welcome to our British Counterparts! Many advantages can be foreseen in the exchange of cost engineering assistance both ways across the Atlantic!

### MONTREAL

Our past national president, John Hackney, is taking a hand in getting a regional section under way in this area. T. J. Hobson and his committee are already at work on a constitution and by-laws. With the aid of the group who met together at Houston, including another past president, Art Miller, Montreal should move ahead fast.

Plans are being made in other areas to provide regional sections wherever there are sufficient members. If you live in any of the following areas, you will benefit both yourself and your fellow engineers by contacting the organizer listed below:

### Baltimore-Washington

Jack Farrell, Catalytic Construction Company, 1528 Walnut Street, Philadelphia 2, Pennsylvania. President of sponsoring section (Delaware Valley).

### Baton Rouge, Louisiana

Carlo H. Polito, Ethyl Corporation, P. O. Box 341, Baton Rouge, Louisiana.

### Cincinnati, Ohio

Richard A. St. John, National Lead Company of Ohio, P. O. Box 158, Cincinnati 39, Ohio.

### Detroit, Michigan

Gilbert A. Smith, The Bristol Company, 10329 West Nichols Road, Detroit, Michigan.

### England

John H. Herbert, 22 Fairway, Leigh-On-Sea, Essex, England.

### Kansas City, Missouri

Lloyd E. West, Jr., 3817 East 72nd Street Terrace, Kansas City Missouri.

### Los Angeles, California

Frank M. Russell, AETRON, Estimating Department, 410 North Citrus Avenue, Covina California.

### Minneapolis — St. Paul

Dr. Bernard J. Gaffney, Wood Conversion Company, First National Bank Building, St. Paul 1, Minnesota.

### Montreal, Canada

John Hackney, BEACO Limited, Suite 369, Queen Elizabeth Hotel, Montreal, P. Q., Canada.

### Niagara Frontier

Richard G. Hopper, Uhl, Hall & Rich, P. O. Box 327, Niagara Falls, New York.

### Toronto, Canada

Frank Grosvenor, The Hydro-Electric Power Commission of Ontario, 620 University Avenue, Toronto 2, Ontario, Canada.

## BRITISH GROUP

The inaugural meeting of this Group took place at the Pontefract Castle Public House, Wigmore Street, London, W. 1., on Thursday, July 14th, 1960.

Thirteen people were present of whom eight were not then members, but had either applied or were applying for membership.

Mr. J. H. Herbert, who had made the arrangements for this meeting, acted as host, and then opened the proceedings by briefly stating his conviction that there was a need on this side of the Atlantic for an organization of Professional Cost Engineers to work on solutions to common problems jointly, particularly those of a specifically European character. The A.A.

C.E. had been the pioneer organization and was doing a great deal of work. It was felt that unless we were in being as a corporate part of A.A.C.E. we were losing those benefits inherent in such an organization which only active and live participation in the work of the A.A.C.E. can provide.

It was felt that we required to know in adequate detail of the objectives and progress of the various technical committees working on specific studies in the U.S. so that we could build on this work and make appropriate contributions to it without having to go over ground already covered. It was also felt that there were a number of specifically British and European problems where we would be able to do work useful to both ourselves and the Association.

A direct and immediate need was the provision of reference material and a service for enquirers as to available data and literature. Mr. Herbert told the meeting that the Kellogg International Corporation management, his employers, had expressed their willingness, while the British end of the Association was in its infancy, to house and even to provide some of the material for a reference library of books and papers dealing with our field, as well as to make available the services of a full-time library staff to look after it and deal with enquiries. Our gratitude is due to them for this very helpful assistance.

Last but by no means least in the objectives of a regional group is the facility for meeting and maintaining contact with other individuals working or interested in the field of cost engineering and providing a forum for the discussion of technical papers. No such meeting ground exists outside the association which, of course, cuts across the normal divisions of the engineering classifications such as civil, electrical, chemical engineering, etc. Membership was an individual matter and not concerned with companies, but a great need for discretion exists in this field, more than in most, not to injure our employers by disclosing confidential information and know-how. Useful work could only be done with the support of our employers and we must, therefore, be at great pains to allay any misgivings there might be on this score.

With regard to the geographical coverage and name of this Regional Section of the Association it was suggested that we should call ourselves the "British Group, American Association of Cost Engineers", rather than adopting the title of a regional section. It was felt that this would reflect the character of this particular section better and aid in gaining more members than a title which suggested a regional section of a purely nationally American organization. This suggestion was agreed to by the members present, although we should have to have formal approval for

it from the Association. If this cannot be given, then we shall call ourselves the "U.K. Section of the A.A.C.E."

Mr. Thomas J. Kent, who had been secretary of the New York Section of the A.A.C.E. for some time prior to coming to the U. K. for a spell of duty here, next spoke, and outlined some of the history and background of the Association. He described the major motive in the growth of the Association as "enlightened self-interest". He stressed the professional character of the Association and the quality of the work done by it.

After these two brief talks the meeting formally agreed that the "British Group" or "U. K. Section" was now formed by the members and applicants present.

The next business, therefore, was to elect officers. Since only actual members could serve and there were only four eligible members present, the choice was limited, but the applicants were permitted to vote by general consent. The following provisional officers were appointed, with their term of office expiring at the Spring meeting of 1961 of the Group: —

Chairman:	J. H. Herbert, Kellogg International Corporation, London.
Deputy Chairman:	K. M. Curwen, Albright & Wilson Manufacturing Ltd., Birmingham.
Treasurer:	G. F. Kirby, Constructors John Brown Ltd., London.
Secretary:	T. B. Woods, Humphreys & Glasgow Ltd., London.

The drafting of a constitution was then discussed and Mr. Kent kindly offered to undertake this, based on his experience in New York. The draft will be discussed by the officers and circulated to the members for comment and acceptance.

It was resolved to levy a Group Subscription of £1 per annum for all members in the British Group.

The next item discussed was how to provide an immediately useful facility to present and future members, and it was agreed that members would be circulated for a list of data and literature in their own possession or accessible to them in their offices, which could be borrowed, copied or referred to by other members of the group. The secretary will be dealing with this in due course and this will amplify the library service, which will take a little while to come into being. It was agreed formally to accept

**DISTINCTIVE AACE  
INSIGNIA  
Now Available**

AACE BULLETIN — VOL. 2, NO. 3



the offer of K. I. C. to make use of their facilities to establish our library.

Finally the question of publicity and of increasing membership was discussed and it was agreed that the Association be asked to inform the technical and other press of our formation. In addition, individual members will write to the Secretaries of any professional bodies to which they belong and inform them of the formation of the group.

All present agreed to meet again early in October to discuss the projects to be tackled by the Group.

#### CHICAGO-MIDWEST SECTION

Chairman Warren W. Twaddle of the Chicago-Midwest Section, in his August 25th Newsletter to the membership, reported that the group plans to hold seven meetings during the period of October through May. One of these is to be a one-day symposium on capital costs comparable to the Profitability Symposium the section held in May, 1960. Three others are to be dinner meetings scheduled in the evening and featuring speakers on the following topics: Profitability, Capital Cost Estimating and Capital Cost Control. The last three meetings will be devoted to workshops.

Mr. Twaddle proposed a number of chapter committees whose responsibility would be to serve the needs of the local chapter, such as, program, membership, publicity, etc. Paralleling the national organization, the following project committees were suggested: (1) Profitability; (2) Cost Index; (3) Capital Cost Estimating; (4) Capital Cost Control; (5) Education; and (6) Operating Cost Estimating and Control.

#### DELAWARE VALLEY SECTION

The Delaware Valley Section held a January 25th meeting at the Philadelphia Engineers Club with 31 members and guests in attendance.

Guest speaker for the evening was Mr. Charles Winters, Manager, Plant Technical Manufacturing, E. I. duPont Company. Mr. Winters' talk was entitled "Creative Cost Estimating".

During the business meeting that followed Membership Chairman Herman Chapman gave a report on his letter sent out to Management Personnel for recruiting. Charles Paul was made chairman of the Nominating Committee and asked to have a slate of candidates ready for the annual election in May, and Dick Balotti was named Program Chairman for the March meeting. A suggestion was made by Fred Franks to mail out the membership list to all members before the March meeting.

Mr. Richard Balotti was the speaker for the March 28th meeting of the Delaware Valley Section. Mr. Balotti is the National Chairman of the AACE Cost

Records Committee, and his subject was the "Aims, Objectives and Accomplishments of the Cost Records Committee." In addition, he gave a report on the progress being made by other national committees.

The May 23rd meeting was well attended by 30 members and guests. The guest speaker was Mr. Eugene O'Brien of I.B.M., whose subject was "Computers and their Application to Cost Engineering". This subject provoked a lively question and answer session.

Immediately following the question and answer period an election of officers for the 1960-61 year was held.

The following men were elected to serve:

President:	John J. Farrell
Vice President:	Edward D. Cocheron
Secretary:	Leslie C. Jenckes
Treasurer:	Herman Marnet
Board of Directors:	Anthony J. Gaeto

After the election of officers, the following points were discussed:

1. A meeting is to be held in July for outgoing and newly-elected officers in order to make this transition period easier;

2. There is a need for more members and better program planning;

3. The national convention and the members of the section who were planning to attend were discussed by the group.

The September 26th meeting was held at the Philadelphia Engineers Club. Following a social hour and dinner, the film showing the construction, nuclear fuel loading and initial operation of Commonwealth Edison's Nuclear Power Station at Dresden, Illinois was presented. The film, which was shown at the annual meeting in Houston, was furnished by the Bechtel Corporation. A representative was sent by Bechtel to the section meeting to discuss estimating and cost control as they were applied on the job at Dresden, where Bechtel was one of the construction contractors.

#### METROPOLITAN NEW YORK SECTION

The Metropolitan New York Section's first luncheon meeting of the season was held on September 13 at the Advertising Club. The speaker was Mr. Carl Morse, President of Diesel Construction Company, who discussed how a general building contractor handles and controls construction costs and scheduling. Mr. Morse, a graduate of Yale University (Civil Engineering) who has had over 33 years of experience in the building construction field, including 25 years with Bing and Bing, a large realty and building firm, proved to be an extremely well-qualified speaker on the subject.

## POTENTIAL MONTREAL SECTION

A group of 14 people interested in exploring the possibility of the establishment of a regional section in Montreal met under the temporary chairmanship of Mr. John W. Hackney on September 21st at the Laurentian Hotel in Montreal. Mr. Hackney opened the meeting with a brief discussion of the AACE and possible interest in the city of Montreal. He mentioned that, in order to stimulate the growth of regional sections, those sections already in existence were undertaking to sponsor new groups. With this end in mind the Metropolitan New York Regional Section had volunteered to sponsor the Montreal group; and Mr. Cecil H. Chilton, Editor of *Chemical Engineering*, who is president of the Metropolitan New York group, would be willing to come to Montreal to help get such a group organized.

After considerable discussion concerning area interest, types of meetings, program suggestions, and methods for attracting membership, the following decisions were made:

1. It was decided that there should be enough interest in Montreal to warrant promotion of a regional section of the AACE.

2. Tentative committees were set up as follows:

Secretary — Hector Boudreau

Program Committee — Chairman, Harvey Jim  
Members, R. Surtees, S. Revay, G. Belle

Membership Committee — Chairman, R. E. B.  
Wallace

Members, J. Bourbeau, A. Leuchter, A. Pat-  
rascu

Constitution & Nominations Committee —  
Chairman, T. J. Hobson

Members, A. Jipa, E. L. Rhodes

Mr. C. Arthur Miller volunteered to assist on any of the above committees in any way he could.

3. A large promotional type of meeting will be held December 5th to which C. H. Chilton has been invited as guest speaker.

4. In order to report progress and make final plans for the December meeting, a supper meeting was planned for Tuesday, October 25, at 6 P. M. at the Laurentian Hotel.

## NEW ENGLAND SECTION

The May 10th meeting of the New England Regional Section was held at the Massachusetts Institute of Technology. After the installation of new officers, there was a spirited discussion concerning the New England Section's role in the 1961 national conven-

tion, which will be held at the Hotel Somerset in Boston, Massachusetts on June 21, 22 and 23rd.

Other business consisted of the appointment of Mr. Philip Johnson as co-chairman of the Membership Committee; the appointment of H. J. DeLamater to contact leading officials, publications, and the Chamber of Commerce in connection with publicity for the Houston convention; and the calling of an executive committee meeting for April 24th.

Mr. John Leslie, Chief of the engineering Division, Corps of Engineers, U. S. Army, was the speaker for the October 11th meeting of the New England section. His talk was of particular interest to the members, many of whom are influenced both directly and indirectly by the current volume of government contracts.

## PROVISIONAL NIAGARA FRONTIER SECTION

The second meeting, an organizational meeting, of the Niagara Frontier Regional Section was held in the Uhl, Hall & Rich Conference Room in Niagara Falls, New York. There were 11 people present.

Mr. R. Hopper read a short summary of the proceedings of the June 9th meeting. In addition, he read a few excerpts from correspondence he had received concerning the formation of a local AACE chapter.

Mr. P. Caro summarized the events leading to submission of the proposed Constitution and By-Laws for the local section by W. Silvia and P. Caro.

Members reported the results of their membership recruitment efforts which totaled 7 prospects.

The name of the section was revised to Niagara Frontier Regional Section to permit personnel from local Canadian companies to participate in the section.

The next order of business was to discuss and adopt the local section's Constitution and By-Laws. This was done after a few insertions and revisions were made.

The following slate of officers for the section were elected:

<i>President:</i>	R. G. Hopper
<i>Vice President:</i>	K. Tracey
<i>Secretary:</i>	P. M. Caro
<i>Treasurer:</i>	W. F. Silvia
<i>Director, 1 Year:</i>	D. E. Waits
<i>Director, 2 Years:</i>	W. T. George

The membership voted meeting nights to be the second Monday of the month. Meetings will usually be dinner meetings and are to commence at 6:30 P.M. The next meeting is to be held October 10, 1960.

A temporary program committee was selected for the October meeting consisting of: J. A. Cull, H. Neibauer, and S. W. Hiter.

It was decided to set section dues at \$3 for the

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**You will want to have a copy of the  
AACE COST INDEX MANUAL**

introduced newly appointed Treasurer Clifford Bierman, who reported that the section was solvent financially.

The secretary, J. T. Connell, distributed reprints of Dr. Bernard Gaffney's paper "Capital Cost Codes II" which was presented at the annual meeting in Houston. Membership chairman Joe Majkut reported on the limited replies to his letter to the section membership and potential membership. Mr. Robert Karns suggested another try at addressing a letter to top corporate management soliciting new members. President Center announced the next meeting would be held November 9 with Mr. William O'Neil of H. P. Foley Company speaking on mechanical and electrical installation costs.

Vice President J. F. Rigatti introduced the speaker, Mr. Ed Huey, Chief Estimator, Power Piping Division, Blaw-Knox Company. Mr. Huey spoke on "Piping Installation Costs" and gave several rules of thumb which are useful in appropriation and area of magnitude estimating. He pointed out that in plant construction piping may represent a small portion of the total project although the amount of estimating is frequently greater than for other parts of the estimate. Mr. Huey emphasized the importance of good historical costs and decried the use of inexperienced help in accounting to accumulate historical cost records.

Director Butler presented proposed revisions to the By-laws of the Section; and, after discussion, the Board requested Director Butler to formally submit the proposed revisions to the membership at the next meeting.

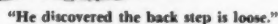
## SAN FRANCISCO SECTION

A meeting of the San Francisco Section was held July 27th at the Leopard Cafe in San Francisco with 52 members and guests in attendance. The meeting was preceded by dinner.

The meeting was opened by President Paul A. Hesselgrave. William E. Hand gave a brief resume of the Houston convention, telling of the opportunity for the section to host the annual convention in 1963. President Hesselgrave asked for a voice vote on the subject of inviting the convention to San Francisco in 1963. The vote was in the affirmative with no opposition, but it was agreed that a ballot would be sent to all absent section members asking them to vote on the subject.

James G. Hoyt told about the action of the Board of Directors in voting to hold a winter workshop. He gave details of the cost and spoke about the possible workshops that might be held. After a general discussion concerning the idea, a motion was passed by the membership approving the presentation of a winter workshop.

Louis J. Coffey, Vice President and Program Chairman, introduced the speaker, Kenneth G. Wolfe, Chief Estimator of the Bechtel Corporation, who spoke on the Dresden Nuclear Power Plant. Mr. Wolfe



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described many of the engineering details of Dresden and also of other reactors, both here and abroad. He discussed estimating problems, cost reduction efforts, and cost control problems relating to this new and largest of all nuclear electric plants in the United States. A colored motion picture made by Bechtel showing the construction of the Dresden Station was presented following Mr. Wolfe's talk. The interest in the speaker's subject was indicated by the prolonged question period which followed the movie.

The October 26th meeting took place at the Leopard Cafe in San Francisco. Guest speaker for the evening was Raymond A. Johrde, Contracting Engineer for Chicago Bridge & Iron Company, whose topic was "Steel Plate Estimating".

The San Francisco Section will hold a winter workshop from December 9th to December 11th at Del Monte Lodge, Pebble Beach, Carmel, California. The workshop will informally open on Friday, December 9th, with a golf match in the morning and afternoon. The first workshop will take place Friday evening with Saturday being devoted to various workshops similar to those at the Houston national convention. Sunday morning a workshop will be held with wives. **The meeting is also open to AACE members from other sections, and it is hoped that many will attend.** Registration cost is \$5.00 per person; no registration cost for wives. Accommodations at the famous Del Monte Lodge overlooking the Pebble Beach Golf Course and the Pacific Ocean, range from \$19.50 to \$25.00 per day per person, including three meals, depending on single or double occupancy and location of room.

#### **PROVISIONAL SOUTHERN CALIFORNIA (LOS ANGELES) SECTION**

Frank M. Russell, our organizer for the Provisional Southern California (L. A.) Section of the AACE, received a gratifying response to his recent questionnaire surveying area interest in the formation of a regional section. Twenty-four people indicated their interest in forming a group and 20 of these noted they planned to attend the September 29th meeting, bringing 6 guests with them.

The September 29th organization meeting was held at the Engineers Club in the Biltmore Hotel in Los Angeles.

The meeting was brought to order by Acting Chairman, Frank Russell, following an hour of sociability and dinner. Twenty-five people attended.

The Chair issued a "Thank You" to Mr. Roger Smith for his efforts in obtaining the "Engineers Club" dining room at the Biltmore Hotel for this meeting.

The roster of members and a map of member location in the Southern California area was distributed to those present for concurrence or corrections.

The Chair, at this time felt the necessity of clarifying the positions of Chairman and Secretary pro tempore. These two persons were serving only with the express understanding that members concur and until such time as elections could be held to fill these offices.

Everyone present was pleased to learn of the interest in our proposed group by the national organization in the form of a letter from W. S. Dodge, Chairman of the Regional Activities Committee. The San Francisco Bay Area Section deserved a vote of thanks for their sponsorship and aid and this was recognized by the floor.

At this point, announcements and recognitions being completed, the business of organization commenced. An excerpt from a letter by W. S. Dodge, National Committee Chairman was read recommending a figure of \$5 for local dues to cover the necessities of the present and future. It was noted that the organization and members would be served best by payment of national and regional dues at one time. The fact that all dues and expenses incurred for the AACE are tax deductible was pointed up.

Since greater than fifty percent of the members of the region were present at the meeting, it was felt a quorum existed. With this in mind the quorum acted as a Board of Directors pro tempore to constitute an organizing body. A motion from the floor to appoint a Constitution and By-Laws Committee was entertained by the Chair and was forthwith seconded and carried by voice vote. Appointments by the Chairman for this committee were:

J. P. Marcey  
A. V. Strathkoetter  
W. W. Gray

The purpose of appointing all members of one firm was to circumvent the problem of communications between members.

The question of a Section name was brought before the body and it decided to denote the Section as the Southern California Section of the AACE.

The next question on the agenda was that of defining Regional physical boundaries. A suggestion was made to have the boundaries coincide with the legal state definition of the Southern California area inasmuch as it does not infringe upon the San Francisco Bay Area Section boundaries. This point will be clarified and resolved at the next Section meeting. R. L. Mayer volunteered to check with the

(Continued on page 62)



# Current Cost Capsules

ARROYAVE, EDWARD A. "Industrial Construction Costs in Latin America," *Cost Eng.*, 5, No. 2, (April 1960), 4-11.

Some typical productivity rates and cost data given. Information was collected from Columbian and Venezuelan projects, and items covered were: (1) buildings and construction items; (2) process equipment; (3) boilers, furnaces, and generators; and (4) electrical work, insulation, painting, and piping.

CHEMICAL ENGINEERING PROGRESS. "Water-Soluble Resins — The Old and the New," 56, No. 6, (June 1960), 112, 117-118.

Water-soluble resins reviewed. Table lists some resins, their annual production, and approximate price. Price per pound of starch and its derivatives is 6-7 cents.

CHEMICAL WEEK. "Air Conditioning Pitches for Plant Sales," 86, No. 20, (May 14, 1960), 49-50, 54.

Explains who should consider plant air conditioning and gives some costs. Total initial investment for worker around \$400; yearly cost of owning equipment per square foot is 40 cents; and yearly cost of operating per square foot is 15 cents.

CHEMICAL WEEK. "Boston Gets Chance at Seaborne Chemicals," 87, No. 2, (July 9, 1960), 33-34, 36.

Liquid chemical distribution terminal to be constructed near Boston. Tank-truck movements from New York and New Jersey plants cost about 5 cents per gallon for most chemicals. After terminal is built, barge or tanker movements should run 3.5 cents per gallon (30 percent less than direct shipment).

DALE, J. M., AND DeHART, R. C. "Nuclear Fire and Brimstone," *Chem. Eng. Prog.*, 56, No. 7, (July 1960), 90, 92-93.

Explains use of nuclear blasts to mine sulfur. Preliminary analysis of sulfur mined in this fashion shows cost of sulfur produced between \$6 and \$8 per long ton.

HANSFORD, R. C., REEG, C. P., WOOD, F. C., VAELL, RAOUL. "Unicracking," *Petrol. Eng.*, 32, No. 5 (May 1960), C-7 - C-12.

Unicracking, as developed by Union Oil, is shown to be economically attractive for converting marginal cracking stocks to gasoline and middle-distillates. Capital and operating costs are given.

HORTON, JOHN T. "How to Determine Low-Temperature Storage Costs," *Petrol. Refiner*, 39, No. 7, (July 1960), 115-118.

Data are given for estimating the installed and operating costs for reduced temperature low pressure storage of compressed gases. Profits can be increased by using greater capacity at low temperature for a continually changing storage capacity. For example: at 1,050 barrel per day propane to storage, 274,050 barrels of low temperature storage compared to 10 days of conventional storage shows an increase in annual profits of

\$27,300. Also this low temperature storage capacity has a payout of 7.7 years.

KECK, ROBERT W. "Save Money — Re-Use Salt Cooling Water," *Petrol. Refiner*, 39, No. 3, (March 1960), 197-199.

Construction and design data are given for adding salt water cooling towers to a once-through system when expanding a refinery which required less capital investment and no increase in maintenance. Comparison of capital investment for both alternates are given. Economic evaluation showed salt water cooling tower to be feasible and give the best payout.

PRATER, N. H. AND ANTONACCI, D. W. "Here's Packaged Boiler Cost," *Petrol. Refiner*, 39, No. 5, (May 1960), 185-186.

Data given for estimating the installed cost of packaged boilers of the fire tube and water tube type. Included are all necessary controls, fittings, relief valves, control panel, oil pump, and heater. Erection labor and tools are given separately. Approximate weights for water tube boilers up to 60,000 pounds per hour and fire tube boilers up to 100 hp.

PRATER, N. H., AND ANTONACCI, D. W. "How to Estimate Installed Pump Costs," *Petrol. Refiner*, 39, No. 3, (March 1960), 161-165.

Data given for the selection of centrifugal pumps, variables affecting their selection, and pump efficiencies. Charts presented for estimating the installed costs for pumps including motors, foundations, and electrical supply. Also included are material costs, labor costs in man hours for setting motor, pump, hauling, unloading, and equivalent machine hours for installing both pump and motor. Data given for estimating electrical wiring, switching, and sub-station costs. Article accompanied by example showing how system and data permit rapid estimation of these installed costs.

SIEDER, E. N. AND ELLIOTT, G. H. "How to Check Costs When Selecting Material for Heat Exchangers," *Petrol. Refiner*, 39, No. 5, (May 1960), 223-228.

It is the exception today when the lowest cost material for your exchanger proves to be the most economical. Costs per pound are given for various materials, and extras for alloy construction in percent of steel base price are given both for 150 and 300 pound working pressure. Cost per square foot of surface are given for 150, 300, 450, and 600 pound working pressure TEMA Class R exchangers with  $\frac{3}{4}$  inch or one-inch tubes.

SILVER, REUBEN, "Computer Control of Catalytic Reforming Processes," *Oil Gas Jour.*, 58, No. 13 (Mar. 28, 1960), 133-148.

Gives a net annual realization for optimum operation due to computer control. Examples are given for savings or profit increases due to increase in service factor, longer catalyst life, reduction in utilities, and increase in process selectivity.

(Continued on page 60)

## What's Happening . . .

**Daniel Litt** is presently Manager—Contract Status Controllers' Division, The M. W. Kellogg Company, New York City. His previous position with the same company was that of Engineer.

**John F. Lovett** has been promoted to Chief Project Engineer with Pittsburgh Coke & Chemical Company, Pittsburgh, Pennsylvania.

**Arthur J. MacKellar** is now President of Cal-Coast Contractors, Inc., Torrance, California. His previous position was that of Estimating Manager, Southern Engineering & Construction Company, Inc., Long Beach, California.

**H. Howard Malkin**, former Supervisor Design and Evaluation for the Allied Chemical Corporation, has been promoted to Chief Process Engineer and transferred from the Glenolden, Pennsylvania office to the Toledo, Ohio office of the corporation.

**Robert R. Markley** has accepted a position as Estimator for Badger Manufacturing Company, Cambridge, Massachusetts. He was previously Estimator with Arthur G. McKee and Company, Cleveland, Ohio.

**Philip E. Martin** is now Engineer with Burgess and Niple of Columbus, Ohio; he was formerly employed by the Ohio Fuel Gas Company of the same city.

**Charles E. McIntyre III**, who was previously Special Evaluation Engineer for El Paso Natural Gas Products Company, El Paso, Texas, is presently Administrative Assistant in the Chemical Activities Department of this company.

**Donald I. Meikle**, former Manager of the Cost Engineering and Estimating Department of Meissner Engineers, Inc., Chicago, Illinois, has been promoted to Controller with the same company.

**Donald W. Meyers** is now Special Planning Manager for Celanese Fibers Company of Charlotte, North Carolina; he was previously Group Leader in the Process Development Department of the same company.

**George H. Michel** has been promoted from Divisional Staff Production Engineer to Manager of the Thermosetting Plastics Department within the Plastics and Resins Division of American Cyanamid Company, Wallingford, Connecticut.

**J. R. Morrison** has accepted a new position as Estimator with West & Wiggs, Incorporated, an engineering and construction company located in Long Beach, California. His former position was that of Estimator with the General Petroleum Corporation, Torrance, California.

**John Mylo** has been promoted from Estimator Engineer with the Decatur, Alabama branch of The Chemstrand Corporation to Chief Estimator with the Pensacola, Florida office of the corporation.

**Wilbur L. Nelson**, Petroleum Refining Consultant, writes that he will consult with E.N.L. (Ente Nazionale Idrocarburi) at Milano, Italy during June and July. On the way to Italy he expects to visit clients in Japan, Iraq and India.

**Blase V. Nemeth** has been promoted from Senior Engineer to Manager of Cost and Construction, Central Engineering Department, Diamond Alkali Company, Cleveland, Ohio.

**Edward A. O'Connell** was moved from the Philadelphia, Pennsylvania office of Merck Sharp & Dohme Division of Merck & Company to the West Point, Pennsylvania office.

**Harry Pappas, Jr.** is now Director of Public Works for the City of Westminster, California. He was formerly associated with Norair, Northrop Division, Hawthorne, California.

**Randolph L. Peel** has accepted a new position as Senior Estimator for the Bechtel Corporation, San Francisco, California. He was formerly employed by Aerojet General Corporation of Covina, California.

**Earle R. Peterson**, previously affiliated with Bay-Fair, San Leandro, California, is presently employed by Kaiser Engineers, Oakland, California.

**Charles Poellhuber**, who was formerly with the Quebec Hydro-Electric Commission Office in Labrieville, Saguenay, P. Q., Canada, is now located in the Montreal office of the same Commission.

**John J. Potoma** has been promoted from Project Estimator to Supervising Estimator for Arthur G. McKee and Company, Cleveland, Ohio. He recently returned from a three-month stay in London where he helped organize and develop the Estimating Department of the newly-formed corporation, McKee Head Wrightson Limited. This firm's primary interests are engineering and construction in the oil and chemical fields.

**Joseph A. Puharic, Jr.** is now Procedures Analyst for the Blaw Knox Company of Pittsburgh, Pennsylvania. His former position was Assistant Supervisor-Senior Cost and Scheduling Engineer with the same company.

**Fred S. Radwanski**, who was formerly affiliated with the Chemstrand Corporation, Pensacola, Florida, is presently Consulting Engineer for and part owner of ENASCO (Engineering Associates, Inc.), a consulting firm of engineers specializing in Process, Industrial, Utility and Development Projects.

## Personnel Service

With the objective of increasing the services to our members, the *Bulletin* includes a Personnel Section.

Members will be permitted two free insertions in the "Men Available" section per year.

There will be a charge for insertions in the "Positions Available" section. Write to the Editor, *AACE Bulletin* for additional information.

### MEN AND POSITIONS AVAILABLE

**Cost Engineer** — Member AACE, degrees in engineering and accounting; 12 years excellent experience chemical and petrochemical plant estimating, cost control, cost analysis, and engineering economic evaluation; available immediately; excellent references: F. A. Bassett, 287 Dogwood Lane, Mentor, Ohio.

### ENGINEERING COST ESTIMATORS

The Chemstrand Corporation, manufacturers of Acrilan and Chemstrand Nylon(R) needs engineers, experienced in the following:

- Construction and Project Cost Estimating
- Construction Scheduling
- Cost Analysis and Control

Bachelor's Degree in Engineering (preferably Chemical or Mechanical Specialization) required with a minimum of 5 years' Engineering experience in the above activities related to the design and construction of major chemical and/or synthetic fiber facilities. Occasional travel and temporary duty assignment at project site involved. Excellent benefit plan. Salary commensurate with training and experience.

Send resume of background including salary history and requirements in confidence to

Manager — Technical Employment & Recruitment  
Box 106  
The Chemstrand Corporation  
Decatur, Alabama

(R) Registered Trademark

**James B. Weaver**, who was Manager of the Economic Evaluation Section at the Atlas Powder Company in Wilmington, Delaware, is now Director of the Development Appraisal Department of the company.

**Isaac J. Wiant**, former Section Engineer, is now Section Head in the Design Engineering Department at The M. W. Kellogg Company, New York City.

**Abraham L. Zinman** is now President of A & B Zinman Incorporated, Long Island City, New York.

**Peter G. Zona** is now President of the Engineering and Management Company, New York City. He was previously Senior Engineer for the American Cyanamid Company of that city.

**Robert O. Bathiany** has been promoted from Engineering Specialist to Associate Director of the Research Division of the Weyerhaeuser Timber Company, Longview, Washington.

**Warren O. Carlson** has accepted a position with the Calgary office of BEACO Ltd. in Alberta, Canada. He was previously affiliated with The C. W. Nofsinger Company of Kansas City, Missouri.

**Paul E. Cates**, who was previously associated with the Engineering Department of Pipeline Technologist, Inc., Houston, Texas, is presently Engineer-Estimator for Fischbach & Moore, Engineering & Electrical Contractors, located in the same city.

**James J. Caufield** is now Manufacturing Research Specialist for General Electric Company, Louisville, Kentucky; he was formerly employed as Assistant Chief Engineer in the Girdler Construction Division of Chemetron Corporation of the same city.

**John S. Jackson** is presently Special Contracts Officer in the Business & Finance Department at the Carnegie Institute of Technology, Pittsburgh, Pennsylvania. His former position was Chief Cost Accountant for the Callery Chemical Company of Pittsburgh.

**James W. MacDonald**, former Estimate-Engineer with Procon, Inc., Des Plaines, Illinois, is now located with PROCOFRANCE in Paris, France.

**Richard W. Masters** has been promoted from Design Engineer with the Pittsburgh, Pennsylvania office of the U.S. Steel Corporation to General Supervisor of Design in the Chicago, Illinois office of U.S. Steel.

**Paul C. Parker**, previously affiliated with the Spencer Chemical Company of Kansas City, Missouri, is presently Associate Economist in the Economics Division of the Midwest Research Institute located in the same city.

**Peter D. Shroff** has accepted a position in the Operations Department of North American Aviation in Downey, California; he was formerly associated with Fluor Products Company of Whittier, California.

We have been informed that **Robert S. Parkins**, Development Engineer with The General Tire & Rubber Company of Akron, Ohio, passed away on May 30th following surgery.

(Continued on page 60)

## **COST ENGINEER**

### **Are you looking for an opportunity to express yourself in all phases of Cost Engineering?**

From you the key results expected include:

Helping to maintain cost estimation systems, and the administration of them — both capital expenditures and manufacturing costs.

Keeping up-to-date cost codes and cost standards and advancing the systems now established.

Providing accurate and timely cost information for budget, project analysis or other purposes and making appropriate economic analyses.

Utilizing electronic data processing systems and procedures to provide top management with concise, accurate, information.

It is expected the applicant would:

Be a graduate engineer with formal or business training in the phases of accounting, statistics and business administration.

Have a minimum of five years experience in cost engineering.

Have a high degree of initiative and ingenuity.

Chemical and mechanical engineering aptitude is pre-requisite. A knowledge of fiber refining and paper and board making is desirable.

The position requires working with all company departments for the many facets of the work. Some travel will be necessary. Initial salary less bonus will not exceed \$10,000 per year. Please send resume to:

**John R. Savage, Personnel Director,  
Wood Conversion Company, Saint Paul 1, Minnesota**

## Technical Papers

Available free, AS LONG AS THEY LAST, to AACE members, (.50 to nonmembers), by request:

- 1 — "Accurate Ways to Estimate Pipe Costs" by W. G. Clark
- 2 — "Computer Speeds Economic Evaluations" by J. F. Adams, W. L. Massey Jr. and M. Dmytryszyn
- 5 — "Ratio Cost Engineering" by H. C. Bauman
- 6 — "The Cost of Preparing an Estimate" by K. G. Wolfe
- 7 — "Which Depreciation Method is Best" by B. J. Gaffney
- 18 — "Estimate Cost of Compression Plants" by I. Bromberg
- 20 — "Estimate Cost of Fractionation Systems" by I. Bromberg
- 21 — "Educational Requirements from the Standpoint of Industry for Future Engineering Graduates" by D. I. Meikle
- 23 — "The Case for Scientific Research in Cost Engineering" by L. R. Shaffer
- 24 — "A Course in Chemical Engineering Economics" by J. Happel
- 25 — "Cost Control in Construction" by W. McGlaun
- 27 — "Economic Evaluation of Research Projects" by R. C. Brown
- 30 — "Measuring and Controlling Maintenance Costs" by Raymond I. Reul
- 31 — "Essentials of Cost Control For Capital Plant Expenditures" by Cost Control Committee, Metropolitan New York Section
- 32 — "Research for Cost Engineering" by G. G. Schrader, L. R. Shaffer, and M. S. Peters
- 33 — "Estimating Labor Productivity and Its Effect on Construction Costs" by Louis Dallavia
- 34 — "Statistics as a Tool for the Estimator" by Stanley A. Gertz and Robert F. Dennee
- 35 — "Evaluation of Estimating Methods" by Thomas J. Roche
- 36 — "The Application of Computers to Capital Cost Estimating" by Estimating Methods Committee, Metropolitan New York Section
- 37 — "Determination of Present Worth of Industrial Plants for Ad Valorem Tax Purposes" by C. E. Lunsford
- 38 — "Competitively Bid Lump Sum Multiple Contract Construction in the Chemical Industry" by George F. McGovney
- 39 — "Optimum Plant Size" by H. C. Thorne, Jr.

The Association is endeavoring to publish in the *Bulletin* or make available reprints of papers that are related to the field of Cost Engineering. If you are preparing a paper or have presented previous papers in this field please send a copy to the Editor so that it can be included in future surveys of data in this area.

## Current Cost Capsules

(Continued from page 57)

SLYNGSTAD, C. E., AND LEMPET, F. L. "Hydrogen Processing," *Petrol. Eng.*, 32, No. 5, (May 1960), C-13 - C-18.

Hydrogen processing is applicable in modern refining to reduce the number of treating processes, provide improved feed stocks, reduce pollution and corrosion. Hydrogen costs are shown and there is a brief discussion of the economics.

WEAVER, JAMES B., AND BATES, ALAN G. "Pitfalls in Incremental Evaluation," *Ind. Eng. Chem.*, 52, No. 2, (February 1960), 57A-58A.

Discusses the incremental or out-of-pocket approach to invest-

## What's Happening . . .

(Continued from page 59)

Paul E. Reichardt has been promoted to Director of the Value Analysis Department of the Washington Gas Light Company, Washington, D. C. He was previously a Value Analysis Engineer for this company.

David G. Reynolds is now Senior Estimator for C. F. Braun and Company, Alhambra, California. He was previously Project Estimator for this company.

James L. Riggio writes from Santiago, Chile, where he has been assigned to help manage Koppers Company, Incorporated activities for a period of three years. Mr. Riggio hopes to maintain good contact with our Association because the fundamentals of cost engineering need to be applied in Chile.

Edward A. Schraishuhn, formerly Supervising Engineer with the Economics Department of Socony Mobil Oil Company, Incorporated, Paulsboro, New Jersey, is now Supervisor of the Research Planning Staff of the company.

Elmer F. Schroeder is now Senior Engineering Specialist for the B. F. Goodrich Chemical Company of Cleveland, Ohio. He was previously Project Engineer.

Harold F. Stamps reports that he recently served on the National Engineers' Week Committee for the Salt Creek Chapter of the Illinois Society of Professional Engineers.

Charles V. Strimlan has been promoted from Supervisor, Estimating Department to Assistant Manager of the Estimating and Budgeting Section, Engineering and Construction Division, Koppers Company, Inc., Pittsburgh, Pennsylvania.

Robert L. Thompson, former Cost Engineer in the Engineering Department of the Kraft Division of West Virginia Pulp and Paper Company in Charleston, South Carolina, is now Engineering Administrator of the same department of this company.

Constantine L. Tsaros has been promoted from Chemical Engineer to Senior Process Engineer for the Institute of Gas Technology, Chicago, Illinois.

Jeter E. Wardrep, Jr. has been promoted to Chief Estimator for The H. K. Ferguson Company in Oak Ridge, Tennessee. He was previously Senior Estimator for this company.

James D. Watson has accepted a new position as Engineer for the Hirsh Electric Company, Houston, Texas. He was formerly employed by Fischbach & Moore, Incorporated of the same city.

ment evaluation. Involved is the forecasting of all cash flows which will occur if the proposed investment is made, and the relevant cash flows expected if the investment is not made.

WEAVER, JAMES, AND BAUMAN, H. C. "Glossary of Cost Estimating Terms. Part I," *Ind. Eng. Chem.*, 52, No. 6, (June 1960), 69A-72A.

The most extensive list of terms to date in the fields of cost and profitability estimation. While disagreements may remain on many definitions, those in most common correct usage were sought. Readers' comment solicited.

WEAVER, JAMES, AND BAUMAN, H. C. "Glossary of Cost Estimating Terms. Part II," *Ind. Eng. Chem.*, 52, No. 7, (July 1960), 53A-56A.

The concluding part of the list presented in the June issue.

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# ELECTED TO MEMBERSHIP

The following people have been elected to membership  
since publication of the *AACE Directory*

Anderson, K. A., Whiting Indiana  
Ashley, William R., Jr., Wilmington, Delaware  
Auburn, Basil J., Pittsburgh, Pennsylvania  
Avondo, Robert C., Pittsburgh, Pennsylvania  
Azud, George, Fleetwood, Pennsylvania  
Bachmann, Hans, Basel, Switzerland  
Baker, Warren J., Jr., Philadelphia, Pennsylvania  
Balmer, Harry A., Niagara Falls, New York  
Barry, John E., Wilmington, Delaware  
Bender, Rene J., New York, New York  
Benskin, Ernest J., London, England  
Benson, Homer E., Pittsburgh, Pennsylvania  
Bernhardt, Lowell, Detroit, Michigan  
Bienenman, Charles E., Riderwood, Maryland  
Blackwood, Frank A., New York, New York  
Blaha, Walter J., Pittsburgh, Pennsylvania  
Blazier, John E., White Plains, New York  
Boeckh, E. H., Washington, D. C.  
Boyd, Norman G., London, England  
Braun, Peter, Montreal, P. Q., Canada  
Bridgeman, John R., Newark, New Jersey  
Bright, James O., Rock Hill, Missouri  
Broomall, Elmer L., Philadelphia, Pennsylvania  
Brower, Walter C., Jr., Mamaroneck, New York  
Brown, Carl, Jr., Brandenburg, Kentucky  
Broyles, Luther J., Detroit, Michigan  
Campbell, Colin, Houston, Texas  
Campbell, Frank J., Covina, California  
Carney, Sheldon G., Midland, Michigan  
Clinehens, J. W., Richland, Washington  
Cook, Lee H., Miami, Florida  
Cooke, Edward F., Cheyenne, Wyoming  
Courtney, Brian F., Tarrytown, New York  
Cull, J. A., Niagara Falls, New York  
Curtis, Ben L., Denver, Colorado  
Dake, Willis E., Glenview, Illinois  
Davagian, John S., Westwood, Massachusetts  
Dawe, Harold F., Denver, Colorado  
Deberdt, F., Montreal, P. Q., Canada  
DeBortoli, Eugene S., Pittsburgh, Pennsylvania  
DiVita, Leo R., Chicago, Illinois  
Dorn, Theodore M., Cleveland, Ohio  
Eazzetta, Dominick A., Pearl River, New York  
Engelman, Richard H., Cincinnati, Ohio  
Fejer, Leslie L., Melbourne, Victoria, Australia  
Ferretti, Emmett J., Cleveland, Ohio  
Flood, H. W., Cambridge, Massachusetts  
Franchi, Joseph R., Dearborn, Michigan  
Froelich, Zeev, Haifa, Israel  
Gaudlitz, Robert T., Decatur, Illinois  
George, Walter T., Niagara Falls, New York  
Gibson, Martin J., Jr., New York, New York  
Gilbert, Oscar G., Jr., Barrington, Illinois  
Glenz, Frederick, Jr., Bergenfield, New Jersey  
Gonda, John E., Pittsburgh, Pennsylvania  
Grant, Walter W., San Francisco, California  
Grossman, Edward, Boston, Massachusetts  
Guthrie, Kenneth M., New York, New York  
Hamilton, Gene E., Marcus Hook, Pennsylvania  
Harbor, Robert N., El Paso, Texas  
Harrison, Victor A., Toronto, Ontario, Canada  
Hellenack, Leslie J., Ridgewood, New Jersey  
Hines, Hollis B., Jr., Calhoun, Tennessee  
Hiscox, William, Elmsmere Port, Cheshire, Eng.  
Hiter, William S., Niagara Falls, New York  
Hobson, Timothy J., Montreal, Quebec, Canada  
Holloway, Allan T., Paramount, California  
Hunn, William R., Jr., Philadelphia, Pennsylvania  
Hupp, Homer N., Pittsburgh, Pennsylvania  
Jipa, Alex, Montreal, P. Q., Canada  
Johnson, Allan L., El Paso, Texas  
Johnson, Edwin M., Boston, Massachusetts  
Joyce, Robert D., Chicago, Illinois  
Kirby, Gerald F., London, England  
Kirby, Ralph C., Silver Spring, Maryland  
Knott, Homer, Baton Rouge, Louisiana  
Kongabel, Harold F., Houston, Texas  
Lamont, Edwin F., Houston, Texas  
Lang, Hans J., London, England  
Larsen, Edwin R., Monroeville, Pennsylvania  
Lefelhocz, Joseph R., Painesville, Ohio  
Leuchter, Roman A., Montreal, Quebec, Canada  
Magnanti, Leo, Solvay, New York  
Mann, Lawrence R., Allentown, Pennsylvania  
Marchetti, Emerino J., Mt. Vernon, New York  
Masi, Dominic M., Jr., Summit, New Jersey  
Mayo, Paul H., New York, New York  
McLaren, George, Sierra Madre, California  
Millman, George, Framingham, Massachusetts  
Mitchell, Michael B., Auburn, Washington  
Mohr, Robert A., Kansas City, Missouri  
Moodie, Donald M., Harrison, New Jersey  
Mosso, Anthony J., Pittsburgh, Pennsylvania  
Muska, George J., Bethel Park, Pennsylvania  
Neibauer, Herman, Youngstown, New York  
Nohlecek, Clarence J., Cleveland, Ohio  
Ohlrogge, Charles A., Midland, Michigan  
Ojala, Irving R., Montreal, P. Q., Canada  
Oplinger, Donald S., Allentown, Pennsylvania  
O'Shell, Harold E., Philadelphia, Pennsylvania  
Palmer, Harry B., Honolulu, Hawaii  
Patrascu, Anghel, Montreal, P. Q., Canada  
Patton, C. E., Houston, Texas  
Perez Rios, Jose D., Santurce, Puerto Rico  
Perry, Louis L., Sr., Houston, Texas  
Pirommer, James E., Santa Monica, California  
Piekarski, Julian A., Milwaukee, Wisconsin  
Piracci, Matthew A., Brooklyn, New York  
Platzer, Sven O. A., Stockholm, Sweden  
Power, James L., Baton Rouge, Louisiana  
Pullen, Leslie W., New York, New York  
Putnam, Amos W., Brentwood, Essex, England  
Quinlan, Harry F., Houston, Texas  
Radoshevich, Marko, Detroit, Michigan  
Rath, Hermann, White Plains, New York  
Revas, Stephen G., Montreal, Quebec, Canada  
Ritchie, R. A., Toronto, Ontario, Canada  
Robbins, W. G., Jr., New York, New York  
Robinson, Clyde R., Campbell, California  
Rohrdanz, R. C., Houston, Texas  
Root, Stephen E., Cambridge, Massachusetts  
Ross, Jack E., New York, New York  
Russell, John M., South Croydon, Surrey, England  
Schall, William C., New York, New York  
Schewe, Millard F., Houston, Texas  
Scully, Michael F., Marcus Hook, Pennsylvania  
Seufert, (Miss) Marion B., Cambridge, Mass.  
Shannon, Christie B., Covina, California  
Simon, Roy A., Covina, California  
Smith, Arthur A., Boston, Massachusetts  
Smith, Allen G., Jr., Niagara Falls, New York  
Smith, Clayton F., Morristown, New Jersey  
Smith, Roger A., Covina, California  
Snelson, William M., Sedro-Woolley, Washington  
Stelly, Wilfred, Newark, New Jersey  
Stephenson, George B., San Diego, California  
Stewart, Clint R., Jr., Houston, Texas  
Suomu, Elmer J., Cambridge, Massachusetts  
Terry, Derek P., Banstead, Surrey, England  
Tracey, Kenneth, Niagara Falls, New York  
Traub, Alexander S., Jr., Briarcliff Manor, N. Y.  
Turnbull, G. Scott, Carlsbad, New Mexico  
Walsh, Henry P., Chicago, Illinois  
Warren, Robert A., Houston, Texas  
Waters, Albert C., Jr., Boston, Massachusetts  
Weidner, Victor P., New York, New York  
Weinwurm, Ernest H., Chicago, Illinois  
Welsh, Charles B., Norristown, Pennsylvania  
Wetterstrom, J. H., San Fernando, California  
Winning, R. P., Erindale, Ontario, Canada  
Woods, Thomas B., London, England  
Workizer, Arnold F., Carthage, Missouri  
Zirkel, William, Evanston, Illinois

## A Symposium — Masonry

(Continued from page 47)

area AGC scale. A "conversion factor" is produced by dividing the sum of local costs by the index costs sum. This factor is applied later, using the unit costs of Table 4.

Table 3 shows typical output ranges. "Scheduled-work" column consists of the masonry production operations by material components being used in the job. Each production operation is extended into units of work, based on an eight-hour day, at the given ranges of the table. The 100% efficiency range is equal to 60 minutes of effective production per hour of the compos-

ite crew working under extremely ideal job conditions.

By applying the production efficiency factor from the Production Range Index, Fig. 1, you find actual units of output per shift for each operation. The production efficiency factor may also be found by summing minutes per hour of effective production that typical crew performs in the field under local conditions. This is accomplished by time-study analysis of nonproductive minutes per hour the craftsmen lose during the day due to local job conditions.

Table 4 shows unit costs corresponding to figures of Table 3. The production-per-shift column reflects

operation and ranges of production in units as given in the output range, Table 3. The labor unit cost column consists of the sum of index costs of the Shift Costs, Table 2 (composite crew costs), divided by the variable units of production.

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## News from the Regions

(Continued from page 56)

local body of ASME as to their definition of Southern California boundaries.

At this juncture, the Chair opened a discussion on the floor regarding the form of government practical and available to the body. It was decided that the Board of Director system be adopted as exemplified by the success of the Bay Area Section.

It was felt by the members present that the By-Laws Committee could perform the function of determining the amount of dues after analysis of necessities. The recommendation of the five dollars by W. S. Dodge was approved as a maximum.

Because of the necessity for expedition in presenting our Charter to the national organization for approval by 1 January 1961, it was deemed practical that the attending membership be constituted a nominating committee at large to deal with the lack of officers. The following officers were elected:

President: Frank M. Russell

Vice President: John P. Marcy

Secretary: Roy A. Simon

Treasurer: George C. Vane

It was suggested at this point that the open offices of Directors at Large be selected from the charter members of the national organization. A motion was accepted to elect three (3) Directors, the first to serve a two (2) year term and the others to serve a period of one (1) year. At the time of re-election only one (1) office of the Directors will be opened while the other office will be replaced by the ensuing Past President. Motion seconded and carried. Secret ballots were written and counted by the Secretary with the results stipulating Mr. Bob Shapiro would hold the Director's Office for the two (2) year period. Mr. Chuck Springfield and Mr. J. R. "Bud" Morrison would hold office for periods of one (1) year. Elections were completed and closed and the nominating committee dissolved.

Discussion for the determination of tenure of officers was opened. It was decided that elected officers would be temporary until such time as the Regional Charter was accepted by the national organization, then they would serve until the first anniversary date.

The business of the inaugural meeting at this point, seemed at an end with the exception of the resolving of the next meeting time and place, which was set for November 10th at the Engineers Club.

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## BACK IN THE "GOOD" OLD DAYS or things have changed

I. Construction of a 137' high, 6' I.D. reinforced concrete stack at Coldwater, Michigan, built in 1914.

Foreman, 29 days at \$6.00 .....	\$ 174
Common labor, 410 hrs. at \$0.20 .....	\$ 82
Materials, sand, gravel, cement and steel .....	\$ 350
Form lumber .....	\$ 30
Use of horse for hoisting concrete, 23 days at \$1.00 .....	\$ 23
Other costs bring the total to less than .....	\$1046

II. Arizona Smelter Co., Clifton, Arizona (1914)

Two 5x8 Aldrich vertical triplex single acting pumps, 37 RPM .....	\$ 1,597.91
Two 10 HP, 30, 60 cycle, 440 volt, 850 RPM motors .....	\$ 287.22
Three Alberger surface condensers 7600 ft. <sup>2</sup> each (total 22,800 ft. <sup>2</sup> ) .....	\$19,436.01

III. Miscellaneous items from an appraisal report (January 1912) for a gas company.

14 assorted horses at \$250 .....	\$3500
2 auto trucks, Reo 1500#, single cylinder, 10 H.P. complete, \$725 .....	\$1450
1 Boiler house, brick and corrugated iron, 25,168 ft. <sup>2</sup> at \$0.05 .....	\$1258
1 Duplex steam pump, 4½" x 2¾" x 4" .....	\$ 51

IV. Pump prices, F.O.B. factory, 1914. Iron, horizontal centrifugal, belt drive

2" Discharge, 3" suction .....	\$ 37
--------------------------------	-------

4" Discharge, 5" suction .....	\$ 65
10" Discharge, 12" suction .....	\$197
18" Discharge, 20" suction .....	\$650

V. Reinforced concrete building costs (1909)

Type	Vol. (cu. ft.)	Floor Area (sq. ft.)
Hospital	703,692	57,654
Office	496,780	39,840
Cold Storage	1,535,000	154,000
Store	1,714,400	168,696

Type	\$/cu. ft.	\$/sq. ft.
Hospital	.0865	1.05
Office	.124	1.545
Cold Storage	.13	1.30
Store	.0827	0.84

Above are for complete building with plumbing, but without heating, lighting, sprinklers, elevators or power equipment.

Building costs in 1909 were 24% higher than in 1886.

Incidentally, the handbook (1750 pages) cost \$6.00.

Carl Clayton sent the above items along. He picked them at random from *Handbook of Mechanical and Electrical Cost Data*, by Gillette and Dana, McGraw Hill, 1918.

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# Regional Section Directory

*If you reside near one of the regional sections, contact the secretary so that you can benefit from the worthwhile activities of your region. If a business trip coincides with a meeting of a section outside your region, you are welcome to participate in any and all activities.*

## CHICAGO — MIDWEST

**Chairman** — William W. Twaddle, Amoco Chemicals Corp., 910 South Michigan Avenue, Chicago 5, Illinois.  
**Secretary** — Daniel T. Brink, Corn Products Co., 201 North Wells, Chicago 6, Illinois.

## DELAWARE VALLEY

**President** — John J. Farrell, Catalytic Construction Co., 1528 Walnut St., Philadelphia 2, Pennsylvania.  
**Secretary** — Leslie C. Jenckes, Sun Oil Co., 1608 Walnut St., Philadelphia, Pennsylvania.

## GULF COAST

**President** — Ray Hopkins, Monsanto Chemical Co., Box 1311, Texas City, Texas.  
**Secretary** — Duncan G. Allen, Allied Appraisal Co., 5901 Beechnut St., Houston 36, Texas.

## METROPOLITAN NEW YORK

**Chairman** — Cecil H. Chilton, Chemical Engineering, McGraw-Hill Publishing Co., 330 West 42nd St., New York 36, New York.  
**Secretary** — Kenneth M. Guthrie, The M. W. Kellogg Co., 711 Third Avenue, New York 17, New York.

## NEW ENGLAND

**President** — Walter H. Langhoff, Metcalf & Eddy, 1300 Statler Bldg., Boston 16, Massachusetts.  
**Secretary** — Philip E. Johnson, Lawson Machine & Tool Co., 120 Mountain Ave., Malden 48, Massachusetts.

## NORTHEAST OHIO

**President** — Milton C. Wakefield, Harshaw Chemical Co., 1945 E. 97th St., Cleveland 6, Ohio.  
**Secretary** — Vernon C. Squires, Goodyear Tire & Rubber Co., c/o Dept. 110D, 1144 E. Market St., Akron, Ohio.

## PITTSBURGH

**President** — C. E. Center, Westinghouse Electric Corp., P.O. Box 1526, Pittsburgh 30, Pennsylvania.  
**Secretary** — Joseph T. Connell, Dravo Corp., Neville Island, Pittsburgh 25, Pennsylvania.

## SAN FRANCISCO

**President** — Paul A. Hesselgrave, General Electric Co., 2151 South First Street, San Jose, California.  
**Secretary** — Gus A. Anderson, Kaiser Engineers, 1924 Broadway, Oakland 12, California.

# National Committee Chairmen

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Carl C. Clayton  
 Columbia-Southern Chemical Corporation  
 P. O. Box 4026  
 Corpus Christi, Texas

## Awards

C. Arthur Miller  
 Canadian Industries Limited  
 P. O. Box 10  
 Montreal, P. Q., Canada

## Bibliography

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 The Dow Chemical Company  
 P. O. Box 351  
 Pittsburg, California

## Capital Cost Control

Charles R. Hirt  
 The Procter & Gamble Company  
 ITC Building, Ivorydale  
 Cincinnati 17, Ohio

## Capital Cost Estimating

Egon F. Brummerstedt  
 Bechtel Corporation  
 62 First Street  
 San Francisco 4, California

## Convention Arrangements (1961)

Harold J. DeLamater  
 Crest Drive  
 Dover, Massachusetts

## Coordination

Elsie Eaves  
 Engineering News-Record  
 330 West 42nd Street  
 New York 36, New York

## Cost Index

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 Tennessee Eastman Company  
 Kingsport, Tennessee

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 Union Carbide Chemicals Company  
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 McGraw-Hill Publishing Company  
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 Houston 25, Texas

## Regional Activities

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 Socony Mobil Oil Company  
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